Interim Agenda of the Committee on Specifications and Tolerances

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300 INTRODUCTION

The Specifications and Tolerances (S&T) Committee ("Committee") will address the following items at its Interim Meeting. All items are listed below in Table A by Reference Key Number. The headings and subjects apply to NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." The Appendices to the Report are listed in Table B. In some cases background information will be provided for an item. The fact that an item appears on the agenda does not mean that the item will be presented to the Conference for a vote. The Committee will review its agenda at the Interim Meeting and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to NIST Handbook 44 which will be presented for a vote at the Annual Meeting.

The recommendations are statements of proposals and are not necessarily those of the Committee. Suggested revisions to the handbook are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in **bold-faced *italics.***

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Table B
Appendices

Details of all Items
(In order by Reference Key Number)

310 GENERAL CODE

310-1 G-S.1. Identification; Built-for-Purpose Software Based Devices, Table G-S.1. Identification, G-S.1.1. Location of Marking Information for Not Built-For-Purpose, Software-Based Devices, and Appendix D; Definition of Not-Built-for-Purpose Device

Source: Carryover Item 310-1.

Recommendation: Amend Section 1.10 General Code paragraph G-S.1. Identification, delete paragraph G-S.1.1., renumbering paragraph G-S.1.2., add new Table G-S.1., and add new definition for "not-built-for-purpose" devices in Appendix D as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly marked **in accordance with Table G-S.1.** for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."
[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

*(d) except for equipment with no moving or electronic component parts and not-built-for-purpose, **~~software~~** **microprocessor**-based devices, a nonrepetitive serial number;*
[Nonretroactive as of January 1, 1968]
(Amended 2003)

(e) for **~~not-built-for-purpose, software~~** **microprocessor**-based devices the current software version designation **or revision number**;
(Added 2003)

(f) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number;
[Nonretroactive as of January 1, 1986]

(g) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.); and
[Nonretroactive as of January 1, 2001]

*(h) for devices that have an NTEP Certificate of Conformance (CC), the CC Number or a corresponding CC addendum number **~~shall be~~** prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).*
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001 and 2003)

~~***G-S.1.1. Location of Marking Information for Not Built For Purpose, Software Based Devices. - For not built for purpose, software based devices, the following shall apply:***~~

~~***(a) the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or***~~

~~***(b) the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or***~~

~~***(c) all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.***~~

~~***Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.***~~
~~***[Nonretroactive as of January 1, 2004]***~~
~~**(Added 2003)**~~

G-S.1.1~~2~~. Remanufactured Devices and Remanufactured Main Elements. - *All remanufactured devices and remanufactured main elements shall be clearly and permanently marked for the purposes of identification with the following information:*

(a) The name, initials, or trademark of the last remanufacturer or distributor;

(b) The remanufacturer's or distributor's model designation if different than the original model designation.
[Nonretroactive as of January 1, 2002]
(Added 2001)

Note: Definitions for "manufactured device," "repaired device," and "repaired element" are also included (along with definitions for "remanufactured device" and "remanufactured element") in Appendix D, Definitions.

Table G-S.1. Identification		
	Built-for-Purpose Instruments, Elements, or Systems	**Not Built-for-Purpose Instruments, Elements, or Systems**
Name, initials, or trademark of the manufacture or distributor	**M**	**D[2]**
Model designation	**M[1]**	**D[2]**
Specific model designation	**M[1] or D**	
Serial number	**M**	**Not required**
Revision number or Software Version number	**M or D**	**D**
Certificate of Conformance (CC) number	**M or D**	**D[2]**

M: **Physically and permanently marked**

D: ***Either: (1) displayed by accessing a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated, or (2) continuously displayed. Note: For revision or software version number, clear instructions for accessing this information shall be listed on the CC in lieu of the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same or subsequent type that was evaluated.***

(Nonretroactive as of January 2004)

Note 1: ***As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.***

(Nonretroactive as of January 200X)

Note 2: ***As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed. Clear instructions for accessing the remaining required G-S.1.information shall be listed on the CC, which may be available as an unaltered copy of the CC printed by the device or through another on-site device.***

(Nonretroactive as of January 200X)

Definition: Not-built-for-purpose device. Any main device or element which was not originally manufactured with the intent that it be used as, or part of, a weighing or measuring device or system.

Alternate Recommendation: NIST Weights and Measures Division (WMD) and the National Type Evaluation Technical Committee (NTETC) Weighing Sector recommend the following amendments:

Amend General Code paragraph G-A.1. Commercial and Law Enforcement Equipment as follows:

G-A.1. Commercial and Law Enforcement Equipment. - These specifications, tolerances, and other technical requirements apply as follows:

(a) To commercial ~~weighing and~~ measuring devices or systems equipment; that is, to weights, and measures, and ~~weighing and~~ measuring devices or systems commercially used or employed in establishing the size, quantity, extent, area, or measurement of quantities, ~~things, produce, or articles for~~ distributed or consumed, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of quantity determination ~~weight or measure~~.

(b) To any accessory attached to or used in connection with a commercial ~~weighing or~~ measuring device when such accessory is so designed that its operation affects the accuracy of the device.

(c) To ~~weighing and~~ measuring devices or systems ~~equipment~~ in official use for the enforcement of law or for the collection of statistical information by government agencies.

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

Amend General Code paragraph G-S.1. Identification as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly marked in accordance with Table G-S.1. for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern, ~~or~~ design, or metrological version or revision of the device in accordance with Table G-S.1;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."
[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts and not-built-for-purpose, ~~software-based~~ electronic devices, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

~~(e) for not-built-for-purpose, software-based devices the current software version designation;~~
~~(Added 2003)~~

(ef) the serial number shall be prefaced by words, an abbreviation, or a symbol that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(fg) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

(gh) ~~F~~f or devices that have an NTEP Certificate of Conformance (CC), the CC Number or a corresponding CC addendum number ~~shall be~~ prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001 and 2003)

Delete General Code paragraph G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-based Devices and renumber G-S.1.2. Remanufactured Devices and Remanufactured Main Elements as follows:

~~*G-S.1.1. Location of Marking Information for Not Built-for-Purpose, Software-based Devices. - For not built-for-purpose, software-based devices, the following shall apply:*~~

~~*(a) the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or*~~

~~*(b) the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or*~~

~~*(c) all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.*~~

~~*Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.*~~
~~*[Nonretroactive as of January 1, 2004]*~~
~~**(Added 2003)**~~

G-S.1.1~~2~~. Remanufactured Devices and Remanufactured Main Elements. - All remanufactured devices and remanufactured main elements shall be clearly and permanently marked for the purposes of identification with the following information:

(a) The name, initials, or trademark of the last remanufacturer or distributor;

(b) The remanufacturer's or distributor's model designation if different than the original model designation.
[Nonretroactive as of January 1, 2002]
(Added 2001)

Note: Definitions for "manufactured device," "repaired device," and "repaired element" are also included (along with definitions for "remanufactured device" and "remanufactured element") in Appendix D, Definitions.

Add new Table G-S.1. Identification as follows:

Table G-S.1. Identification		
	Built-for-Purpose Instruments, Elements, or Systems	**Not-Built-for-Purpose Devices or Elements**
Name, initials, or trademark of the manufacture or distributor	**M**	**D[2]**
Model designation	**M[1]**	**D[2]**
Specific model designation[3]	**M[1] or D**	
Serial number	**M**	**Not required**
Metrological version or revision designation[3]	**NA**	**D**
Certificate of Conformance (CC) number	**M or D**	**D[2]**

M: **Physically and permanently marked**

D: ***Either: (1) displayed by accessing a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify the software in the device is the same type that was evaluated, or (2) continuously displayed. Note: For revision or software version number, clear instructions for accessing this information shall be listed on the CC in lieu of the "Help" menu. Required information includes that information necessary to identify the software in the device is the same or subsequent type that was evaluated.***
(Nonretroactive as of January 2004)

Note 1: ***As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.***
(Nonretroactive as of January 200X)

Note 2: ***As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed. Clear instructions for accessing the remaining required G-S.1.information shall be listed on the CC~~, which may be available as an unaltered copy of the CC or printed by the device or through another on-site device~~.***
(Nonretroactive as of January 200X)

Note 3: ***Metrological version or revision designation for devices with downloadable or field programmable software.***

Add new General Code Terms and Definitions as follows:

measuring device (general) – A device (instrument) intended to be used to make measurements, alone or in conjunction with supplementary devices. (VIM)

measuring system (general) - An instrument or group of instruments that serves to make measurements, alone or in conjunction with supplementary devices. (VIM)

electronic devices – A device operating by the principles of electronics, which may consist of one or more subassemblies and performs a specific function(s). (ASTM)

not-built-for-purpose device -- Any electronic peripheral or auxiliary device or element which was not originally manufactured with the intent that it be used as, or part of, a weighing or measuring device or system.

metrological software version (revision) – A designation that specifically defines the metrological software version used in a measuring instrument, system, or peripheral/auxiliary device with field programmable or downloadable metrological software).

weighing device (instrument) -- A measuring instrument that serves to determine the mass of a body by using the action of gravity on said body. The instrument may also be used to determine other quantities, magnitudes, parameters or characteristics related to the determined mass. According to its method of operation, a weighing instrument is classified as an automatic or non-automatic instrument. (OIML R 76)

Amend the definition for built-for-purpose device as follows:

built-for-purpose device – Any main, peripheral, or auxiliary device or element which was manufactured with the intent that it be used as, or part of, a ~~weighing or~~ measuring device or system.

Background/Discussion: At the 2003 NCWM Annual Meeting, the Committee agreed that a proposal submitted by the Scale Manufacturers Association (SMA), to include "built-for-purpose" devices in G-S.1. and to define "not-built-for-purpose" devices should remain an information item. At the 2004 NCWM Interim Meeting, the Committee heard both support and opposition to the proposal developed by the Measuring Sector at its October 2003 Meeting and shown as the recommendation above. There was general support for the table developed by WMD as modified by the Measuring Sector and for the definition of "not-built-for-purpose" device. The SMA opposed the Measuring Sector's proposal because the language imposes different requirements for "built-for-purpose" and "not-built-for-purpose" devices. The primary SMA opposition was that the Measuring Sector proposal requires "built-for-purpose" devices to have the name of the manufacturer, the model designation, and a nonrepetitive serial number physically marked on the device and could be permanently marked or displayed on "not-built-for-purpose" devices. The SMA believed that "built-for-purpose" devices should have the same option of marking or displaying the information on the device. One official stated that the revision number or software version number should be marked or displayed on "built-for-purpose" devices as is now required on not-built-for-purpose devices. The official expressed concern that changes could be made to the programming of some "built-for-purpose" devices that would not be readily apparent to the official. Marking or displaying a new version number will assist officials in determining whether or not the metrological functions of the device are the same as the model submitted for NTEP evaluation. The Committee agreed that the revision number or software version numbers should be available to officials and modified Table G-S.1. to require that "built-for-purpose" devices have the current revision number or software version displayed or permanently marked on the device. The Committee also agreed that Handbook 44, OIML R-76 "Non-automatic weighing instruments," and OIML R117 "Measuring systems for liquids other than water" all require the name of the manufacturer, a model designation, and serial number information to be marked on a "built-for-purpose" device. The Committee agreed that continuing the requirement for marking basic identification information did not place an additional burden on "built-for-purpose" device manufacturers. The Committee agreed to present Item 310-1 for adoption at the 2004 NCWM Annual Meeting.

At the 2004 Annual Meeting, during the open hearing the SMA stated that item 310-1 should not go forward for a vote because the ballot of the NTETC Weighing Sector failed to express clear support for the item. One manufacturer stated that the term microprocessor is not appropriate because their devices contain several of those components. Another manufacturer stated that the requirement for marking the current software version number would place an unrealistic burden on their company. The Committee agreed that sufficient opposition and questions were raised during the open hearing to demonstrate that the item was not sufficiently developed to be a voting item at that meeting. The Committee made Item 310-1 an information item and returned it to both Sectors for further development.

At its Fall 2004 Meeting, the Weighing Sector reviewed the information from the Committee, previous Sector recommendations, and information regarding international requirements. The Sector also reviewed an alternate recommendation for S&T agenda item 310-1 from WMD, which includes changes to G-A.1. The most significant change to G-A.1. is the elimination of the term "weighing" and to utilize the more general term "measuring" for devices or systems that measure mass, length, or volume. The WMD recommendation included new and amended definitions and addressed concerns raised during the Committee's deliberations on this item. The new definition for a "weighing device" describes it a "measuring instrument" that serves to determine the mass of a body by using the action of gravity on said body. Although this change is a departure from conventional terminology for "scales" it is consistent with OIML recommendations and facilitates harmonization between Handbook 44 and international standards. The definition for "not-built-for-purpose" devices was revised to clarify their use as auxiliary or peripheral equipment devices and systems. Some of the private Sector members repeated their previous comments that current technology permits the display of required identification information and that there is no technical justification for treating these devices differently than not-built-for-purpose devices. Additionally, the proposed definitions would reclassify most measuring devices according

to the physical property being measured (e.g., liquid, length, vapor, cryogenic, etc.) Since the proposed definition for measuring devices applies to all types of devices, some concern was expressed that laws and regulations would need to be changed because many states' statutes refer to "weighing and measuring" device terminology. The Weighing Sector supported the alternate recommendation with changes in the marking requirement for Metrological version or revision designation in Table G-S.1. for "built-for-purpose" instruments, elements, or systems from "marked or displayed (M or D)" to "not applicable (NA)" and the added "weighing device" definition. The Weighing Sector agreed to send the alternate proposal to the NTETC Measuring Sector, the WWMA, and Southern Weights and Measures Association (SWMA) for their review and comments.

At the October 2004 Northeastern Weights and Measures Association Meeting, several participants indicated that the requirements for "Built-for-Purpose" and "Not Built-for-Purpose" devices should be the same. An Associate member commented that for a manufacturer to report to NTEP every time a metrological change is made to software is unnecessary. A certain amount of trust must be placed in the manufacturer. This member also explained that manufacturers want to be innovative with software development and expressed concern that requirements for a current software version number may hamper future innovations.

At its October 2004 Meeting the Measuring Sector reviewed the original alternate recommendation developed by WMD. The alternate proposal was similar to the alternate proposal above with the exception of the marking requirement for Metrological version or revision designation in Table G-S.1. for "built-for-purpose" instruments, elements, or systems and the addition of a "weighing device" definition. In the proposal above the requirement is "NA." In the version on the agenda of both Sectors the requirement was for it to be "M or D." The members agreed that the majority of the changes proposed to include built-for-purpose devices concern weighing devices and are not applicable to measuring devices. One member objected to the proposal to eliminate references in G-A.1. to the term "weighing " and the dual use of the term "measuring" to refer to all forms of measurement including weighing. The member stated that the proposal was in conflict with the historic use of the term "measurement" in the United States. The Sector agreed to forward a recommendation to the Committee that the proposal to include "built-for-purpose" devices in G-S.1. Identification be withdrawn from the S&T agenda.

At its October 2004 Meeting the SWMA S&T Committee did not include this item on its agenda for a vote of the members; however, it did accept comments during the open hearings. The SWMA learned that the SMA wants the requirements for marking Name, Model, and Serial number in Table G-S.1. for "built-for purpose" instruments, elements, or systems to allow either physically marked (M) or displayed (D) just the same as the requirements in the table for specific model designation or CC. One manufacturer of retail motor-fuel dispensers supported the recommendation provided the requirement for metrological revision designation for "built-for purpose" instruments, elements, or systems is changed for M or D to NA as recommended by the Weighing Sector. The SWMA agreed to forward the comments to the Committee without a position.

The SMA opposes this item in its current format and recommends that the NCWM form a Working Group to further develop the proposal.

For more background information, refer to the 2003 and 2004 S&T Final Report.

310-2 G-T.1. (e) Acceptance Tolerances

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector:

Recommendation: Modify Handbook 44 Section 1.10 Paragraph G-T.1. (e) Acceptance Tolerances as follows:

G-T.1. Acceptance Tolerances. - Acceptance tolerances shall apply to:

(a) equipment to be put into commercial use for the first time;

(b) equipment that has been placed in commercial service within the preceding 30 days and is being officially tested for the first time;

(c) equipment that has been returned to commercial service following official rejection for failure to conform to performance requirements and is being officially tested for the first time within 30 days after corrective service;

(d) equipment that is being officially tested for the first time within 30 days after major reconditioning or overhaul; and

(e) equipment undergoing type evaluation (special test tolerances are not applicable).

Discussion/Background: At its October 2004 NTETC Meeting, the Measuring Sector discussed the intent of G-T.1. (e), which states that acceptance tolerances apply to all equipment undergoing type evaluation as it relates to special test tolerances.

The Sector agreed that special test tolerances should not be applicable during an NTEP evaluation and to forward a proposal to modify Handbook 44 paragraph G-T.1. (e) Acceptance Tolerances, as shown above, to the NCWM and Southern Weights and Measures Association (SWMA) S&T Committees for consideration.

At its October 2004 Meeting, the SWMA reviewed the recommendation and agreed to forward it to the Committee with the recommendation that it be a voting item on the Committee's 2005 Agenda.

320 SCALES

320-1 S.1.1. (c) Zero Indication; Requirements for Markings or Indications for Other than Digital Zero Indications

Source: Carryover Item 320-8. (This item originated from the NCWM S&T Committee and first appeared on the Committee's 2004 agenda.)

Recommendation: Amend paragraph S.1.1. (c) as follows:

S.1.1. Zero Indication.

(a) On a scale equipped with indicating or recording elements, provision shall be made to either indicate or record a zero-balance condition.

(b) On an automatic-indicating scale or balance indicator, provision shall be made to indicate or record an out-of-balance condition on both sides of zero.

(c) A zero-balance condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition **and is marked or includes supplemental indications or markings to indicate that the "other than digital zero indication" represents a no-load condition of the scale.**
Added 1987 **(**Amended 1993 **and 200X)**
(Amended 1987)

Background/Discussion The Committee proposes to modify paragraph S.1.1.(c) to clarify the requirement's original intent for marking zero indications on scales and point-of-sale systems, where a zero-balance condition is represented by other than a digital zero indication. The proposal is the Committee's response to the 2003 NTETC Weighing Sector's request for clarification on whether scales that use scrolling messages, dashes, etc. to indicate zero require additional markings or indications (1) to inform customers that the scales are at a zero-balance condition and (2) to properly identify the feature as specified in General Code paragraph G-S.6. Marking Operational Controls, Indications, and Features.

The proposal is consistent with other Handbook 44 code requirements adopted to ensure that customers have sufficient information to make an informed decision during a direct sale weighing transaction. These codes require marking and/or

identification of values, graduations, units, and indications in the displayed and recorded transaction information. Handbook 44 includes requirements for clearly identifying operational controls and features used in weighing applications. Additionally, Handbook 44 requirements specify that the size, proximity, and position of that information shall be such that it is easily read and is appropriate for that application.

In 2003, the Weighing Sector reported there was ongoing disagreement among NIST Weights and Measures Division (WMD), the NTEP Participating Laboratories, and manufacturers with the interpretation of NIST Handbook 44 General Code paragraph G-S.6. Marking Operational Controls, Indications, and Features, Scales Code paragraph S.1.1. Zero Indication, and the interpretation of related discussions in the 78th (1993) NCWM Specifications and Tolerances (S&T) Final Report Item 320-1 S.1.1. Zero Indication. This resulted in inconsistent type evaluations and weights and measures code enforcement for scales and point-of-sale systems interfaced with scales that use methods such as screen savers, power savers, scrolling displays, and modes of operation to indicate that a device is at a no-load condition. NIST and some of the NTEP Participating Laboratories agreed that General Code paragraph G-S.6 requires weighing devices to be marked or an indication provided that states that zero-balance is represented by other than a digital zero indication. NIST and those same laboratories noted this interpretation was supported by the 1993 S&T Final Report. Other Participating Laboratories and some manufacturers stated that the markings were not necessary because Handbook 44 paragraph S.1.1. (c) does not specifically state that the additional markings are required and the actions of the 78th NCWM to amend paragraph S.1.1.(c) provided sufficient customer protection for devices that use this feature.

Weights and measures officials indicated there may be "not-built-for-purpose" devices that do not comply with the proposed interpretation. These "not-built-for-purpose" devices are interfaced with approved devices; however, the system continues weighing when the scale is off zero. Consequently, officials questioned whether the proposed changes to paragraph S.1.1.(c) are intended to be nonretroactive requirements.

In July 2004, the Committee agreed that its proposal to modify paragraph S.1.1.(c) was consistent with the original intent of the requirement. After hearing comments about how some systems are designed to operate, the Committee took the position that additional language was needed to clarify that no marking is required if operator intervention is necessary to verify a zero condition before the start of a transaction. The Committee made the proposal an information item to provide sufficient time for input from the Weighing Sector, who did not have the proposal available at its 2003 meeting and to receive any language that addresses operator intervention.

The Committee believes the proposal provides a record of how to apply the requirement. The Committee agreed that the original intent of the requirement was that all primary indicators comply with paragraph S.1.1., therefore, the proposal should be a retroactive requirement.

At its August 2004 meeting, the Weighing Sector agreed with the Committee's interpretation, but did not find it necessary to modify paragraph S.1.1.(c) because NCWM Publication 14 was amended in 2003 to include checklist procedures to verify that digital electronic scales equipped with other than a continuous digital zero indication comply. Publication 14 test procedures specify methods for defining the zero indication when the zero condition of the scale is represented by other than a continuous digital zero indication. The Weighing Sector agreed the proposal represents an S&T Committee agenda item and the type evaluation aspects of this issue have been resolved.

The Northeastern Weights and Measures Association (NEWMA) indicates there is little support for this proposal. Many at NEWMA believe that the NTEP laboratories already have the necessary information to properly perform evaluations.

The Scale Manufacturers Association agreed that the current evaluation process that is based on paragraph S.1.1.(c) prevents facilitation of fraud.

320-2 S.1.8.4. Recorded Representations, Point-of-Sale Systems; Footnote 1

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Amend S.1.8.4. Recorded Representations, Point-of-Sale Systems; Footnote 1 as follows:

S.1.8.4. Recorded Representations, Point-of-Sale Systems. - The sales information recorded by cash registers when interfaced with a weighing element shall contain the following information for items weighed at the checkout stand:

(a) the net weight,[1]

(b) the unit price,[1]

(c) the total price, and

(d) the product class or, in a system equipped with price look-up capability, the product name or code number.

[1]Weight values shall be identified by kilogram, kg, grams, g, ounces, oz, pound, **or** lb~~**, or the sign "#."**~~ For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams. (Amended 1995 **and 200X**)

The Western Weights and Measures Association (WWMA) and Central Weights and Measures Association (CWMA) recommend an alternate proposal to amend paragraph S.1.8.4. Footnote 1 as follows:

[1]Weight values shall be identified by kilogram, kg, grams, g, ounces, oz, pound, **or** lb~~**, or the sign "#."**~~ ***The "#" is not acceptable.*** For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams.
[Nonretroactive as of January 1, 200X]
(Amended 1995 **and 200X**)

Discussion: The Weighing Sector proposes removing the # symbol from paragraph S.1.8.4. footnote 1 because the symbol represents a multitude of terms used in many unrelated disciplines and because of advances in printer technology.

In 1976, the Committee reviewed numerous examples of transaction information and provided clarification on how that information should be formatted on recorded representations. The Committee indicated the # symbol was an acceptable representation for pound on point-of sale system's receipts. The Committee noted that the # symbol was acceptable because it was recognized in a widely used reference Dictionary at that time. The "#" only requires one column whereas the two characters in "lb" need two columns although both the symbol and abbreviation are considered acceptable representations for pound.

Currently, NCWM Publication 14 "NTEP Technical Policy, Checklists and Test Procedures" Section 75 List of Acceptable Abbreviations/Symbols recognizes the # symbol as acceptable, but discourages using the # symbol for recorded representations for electronic cash registers (ECR) and point-of-sale (POS) systems. One manufacturer reasoned that if the symbol is suitable for recorded representations for ECRs, then there is no justification for prohibiting use of the # symbol for other recorded representations or markings. The manufacturer concluded that the # symbol should be acceptable in all instances or not acceptable in any weighing applications.

The WWMA, CWMA, and Southern Weights and Measures Association agreed the # symbol is no longer acceptable, but this should not be applied retroactively.

The Northeastern Weights and Measures Association also supports removing the # symbol from paragraph S.1.8.4. footnote 1.

The Scale Manufacturers supports the WWMA and CWMA alternate proposal stated above.

320-3 S.1.8.5. Computing Scale Interfaced to a Cash Register

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Add new paragraph S.1.8.5. to the Scales Code as follows:

S.1.8.5. Computing Scale Interfaced to a Cash Register. – A computing scale may interface with a cash register provided:

(a) the cash register only records (serves as printer) the information received from the scale,

(b) the computing scale has tare capability,

(c) the computing scale is not equipped with PLU capability,

(d) The electronic cash register does not have any input to the computing scale in the process of determining the total price of a weighed item.

(Added 200X)

Discussion: The proposal adds new device specific code requirements to the Scales Code to address the proper interface of computing scales with Electronic Cash Registers (ECR). The current Handbook 44 General Code provisions that specify equipment and its associated devices shall not facilitate fraud are not sufficient to clarify how a computing scale interfaced with an ECR should operate. The proposal recommends adding new language to the Scales Code to clarify how each component must display transaction information, function in taking tare, and operate with Price-Look-Up (PLU) capability.

Weights and measures field officials report that they find computing scales interfaced with ECRs, where the ECR accepts weighing results from the computing scale and uses the ECR's price look-up (PLU) feature to retrieve tare and unit price information, and calculate the total price. Officials report that a different unit price, tare, and total price may already be manually entered and displayed on the computing scale. What the customer views on the computing scale as the net weight, unit price, and total price may not be what the customer is actually charged by the ECR.

The proposed new code language is taken from existing type evaluation criteria. The NTEP Participating Laboratories agreed the problems observed occur only in devices not held to this criteria. In this instance, the NTEP Certificate of Conformance (CC) did not list the interface as an approved application.

The Western Weights and Measures Association withdrew this item from its agenda because there was only minimal support for the proposal in the Weighing Sector.

The SWMA believes that the proposal provides specific guidance for weights and measures field officials that is clearer and easier to enforce than the General Code requirements for facilitation of fraud and agreed to forward the proposal to the NCWM S&T Committee for consideration as a voting item.

The Scale Manufacturers Association opposes the proposal, but recommends the following alternate language because the proposal was written inadvertently imposes design restrictions on the device:

S.1.8.5. Computing Scale Interfaced to a Cash Register. – A computing scale may interface with a cash register provided all displayed and recorded indication agree:

320-4 S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism (Zero Tracking), S.2.1.3.1. For Scales Manufactured Before January 1, 200X; Maximum Load Rezeroed, S.2.1.3.2. For Scales Manufactured After January 1, 200X; Maximum Load Rezeroed, and S.2.1.3.3. Automatic Zero-Setting Mechanism (Zero Tracking) on Class III L Devices

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Modify paragraphs S.2.1.3.and S.2.1.3.1. and add new paragraphs S.2.1.3.2.and S.2.1.3.3.as follows:

S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism (Zero Tracking). ~~– Under normal operating conditions~~

***S.2.1.3.1. For Scales manufactured before January 1, 200X**, the maximum load that can be "rezeroed" when either placed on or removed from the platform all at once **under normal operating conditions**, shall be:*

(a) for bench, counter, and livestock scales: 0.6 scale division;

(b) for vehicle, axle-load, and railway track scales: 3.0 scale divisions; and

(c) for all other scales: 1.0 scale division.
[Nonretroactive and enforceable as of January 1, 1981]

S.2.1.3.2. For Scales manufactured after January 1, 200X, the maximum load that can be "rezeroed" when either placed on or removed from the platform all at once under normal operating conditions, shall be:

(a) for vehicle, axle-load, and railway track scales: 3.0 scale divisions; and

(b) for all other scales: 0.5 scale division.
(Added 200X)

*S.2.1.3.~~1~~3. Automatic Zero-Setting Mechanism **(Zero Tracking)** on Class III L Devices - Class III L devices equipped with automatic zero setting mechanisms shall be designed with a sealable means to allow the automatic zero setting to be disabled during the inspection and test of the device.*
[Nonretroactive as of January 1, 2001]
(Added 1999) **(Amended 200X)**

Discussion: This proposal revisits the 2003 Weighing Sector's concerns about holding the same device to different AZSM requirements solely based on whether the device is located on a counter or on the floor. The confusion over how to apply AZSM requirements is compounded when a family of scales covered on an NTEP Certificate of Conformance includes both bench/counter scales and other platform type scales. Currently, paragraph S.2.1.3. specifies a different maximum load that can be rezeroed under normal operating conditions for bench/counter scales (0.6 scale division) and all other scales (1.0 scale division)

The proposal is also intended to partially align the automatic zero tracking requirements in paragraph S.2.1.3 with those of Measurement Canada and OIML R 76 "Non-automatic Weighing Instruments." AZSM requirements for Class III L scales remain unchanged.

The Weighing Sector asks that the proposal become a developing item on the NCWM S&T Agenda while the regional weights and measures associations consider its effect on field evaluations. The Weighing Sector's public members question how the field official will determine the date of manufacture and whether training is needed. The Weighing Sector's industry members requested a delayed enforcement date to allow sufficient time for changes to devices nearing the end of their production cycle.

The Western Weights and Measures Association (WWMA) believes there is sufficient time between now and July 2005 to gather data to determine if there will be enforcement issues. The WWMA agreed that while input from field officials is necessary the proposal can move forward as a voting item.

The Central Weights and Measures Association hearing no comments on the proposal recommends it move forward and become a voting item.

The Southern Weights and Measures Association agreed with the concern stated by public members of the Weighing Sector that it is difficult for field officials to determine when a device was manufactured and recommends that the proposal be an information item.

NIST Weights and Measures Division believes that field officials will have no difficulty with enforcing the proposal based on equipment manufacture date since they already successfully establish that criteria when enforcing other nonretroactive requirements.

The Scale Manufacturers Association (SMA) believes the proposal has no technical merit and is only an attempt to harmonize United States and OIML requirements. The SMA supports harmonization of the United States and international requirements, but is concerned about the potential for unnecessarily increasing evaluation costs. The SMA does support this effort toward harmonization provided NTEP waives the resulting additional evaluation of existing devices.

320-5 Table S.6.3.b. Notes For Table S.6.3.a.Note 3; Nominal Capacity and Value of the Scale Division and Appendix D; Definition of Reading Face

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Amend Table S.6.3.b. Notes For Table S.6.3.a. Note 3 and revise the definition for "reading face" as follows:

3. *The nominal capacity and value of the scale division shall be shown together (e.g., **~~50 000 x 5 kg, 100 000 x 10 lb~~**, 15 x 0.005 kg , or 30 x 0.01 lb) **~~adjacent to the weight display~~** **in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator unless** **~~when the nominal capacity and value of the scale division are not immediately~~** **already** apparent **by the design of the device**. Each scale division value or weight unit shall be marked on multiple range or multi-interval scales.*
   [Nonretroactive as of January 1, 1983]

(Amended 200X)

reading face. That portion of an automatic-indicating weighing or measuring device that gives a visible indication of the quantity weighed or measured. A reading face may include an indicator and a series of graduations or may present values digitally, and may also provide money-value indications. [1.10**, 2.20]**
(Added 200X)

The NIST Weights and Measures Division (WMD) recommends an alternate proposal to amend Table S.6.3.b. Note 3 as follows:

3. *The nominal capacity and value of the scale division shall be shown together (e.g., **~~50 000 x 5 kg, 100 000 x 10 lb,~~** 15 x 0.005 kg , or 30 x 0.01 lb) **near** **~~adjacent to~~** the weight display when the nominal capacity and value of the scale division are not immediately apparent. Each scale division value or weight unit shall be marked on multiple range or multi-interval scales.*
   [Nonretroactive as of January 1, 1983]

(Amended 200X)

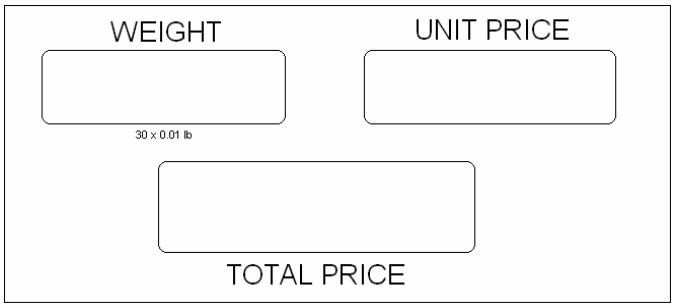
Discussion: The proposal is intended to provide guidelines on the placement of the required nominal capacity and scale division information on equipment. Currently, Table S.6.3.b. Note 3 specifies the information shall be shown together adjacent to the weight display. In 1990, the Committee was unable to arrive at definitive guidelines on what is meant by "adjacent" and left the interpretation to NTEP Participating Laboratories and any manufacturer's challenges to the laboratory's interpretation were to be heard by the NTEP Board of Governors (now NCWM NTEP Committee).

NCWM Publication 14, "NTEP Technical Policy, Checklists, and Test Procedures" for Digital Electronic Scales Section 2.13 states:

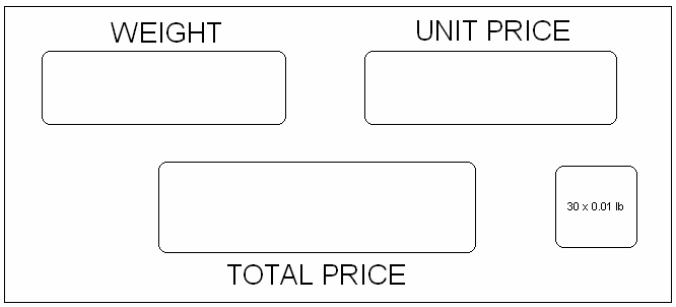
> 2.13. The nominal capacity by minimum scale division shall be clearly and conspicuously marked adjacent to the weight display. (Acceptable location depends on conspicuousness).

Past attempts to interpret this requirement continue to cause conflict between NTEP Laboratories and manufacturers. Paragraph 2.13 implies that "conspicuousness" should be the primary concern, rather than "adjacent." The NTEP Laboratories agree that until "adjacent" is removed from the requirement, the labs are tied to that interpretation.

The NTEP Laboratories maintain that the information shall be marked next to the weight display on the face of a scale, but continue to receive devices with the required markings located elsewhere on the face of the scale as shown below in Example 2.



Example 1



Example 2

The NTEP Laboratories agree that Example 2 is incorrect according to Handbook 44 because the markings do not appear adjacent to the weight display. Additionally, the markings are not placed as close as practical to the weight indication as required in General Code paragraph G-S.5.2.4. Values. The NTEP Laboratories acknowledge that the operator is already familiar with the device and the customer does not fully understand the significance of this information. The markings in both examples are conspicuous enough for the inspector and service technician who rely most heavily on the information. Both examples would be acceptable if Note 3 could be amended to allow for placing the markings conspicuously on the face of the indicating portion of the scale.

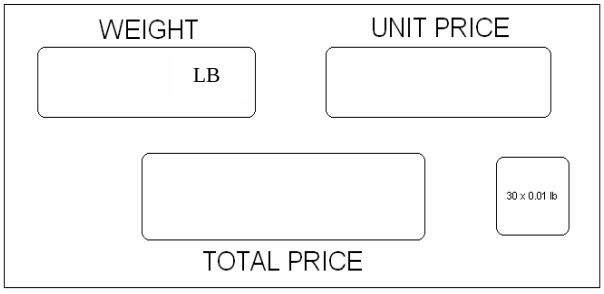
The Weighing Sector considered the NTEP Participating Laboratories recommendation for adding a new definition to Handbook 44, Appendix D - Definitions to accompany the existing definitions for "face" on taximeters and dispensers. However, the Weighing Sector believes it would be more appropriate to modify the existing definition of "reading face" to reference the Scales Code 2.20 and to change "face" to "reading face" in Table S.6.3.b., Note 3 and forwarded a recommendation accordingly. The Weighing Sector believes that the proposal shown in the recommendation above amends Handbook 44 to permit acceptance of both Examples 1 and 2.

The Central Weights and Measures Association agreed with the Weighing Sector proposal shown in the recommendation above.

The Western Weights and Measures Association (WWMA) discussed how paragraph S.5.2.4. requirements for values are not intended to apply to the nominal capacity statement and does little to help the customer determine the acceptability of a weight value. The WWMA agreed to the same wording shown in the Weighing Sector's proposal and recommends that the proposal move forward as a voting item.

The Northeastern Weights and Measures Association concluded that this is an NTEP issue and "adjacent" is the correct terminology since it represents "abutting" or "next to."

The Southern Weights and Measures Association (SWMA) agreed with the Weighing Sector's proposal provided the unit of weight is identified in a manner that is consistent with requirements in paragraph G-S.5.2.4. Values for placing as close as practicable adequate and sufficient information to define graduations, indications, or recorded representations. The SWMA agreed that Example 1 is an example of "adjacent to," but also provided Example 3 shown below, which is a demonstration of markings that are not "adjacent to" the weight display. The SWMA noted that Example 3 also provides an example of how the unit of weight shall be displayed in the weight display when the nominal capacity and value of the scale division are not adjacent to the weight display. The SWMA agreed that Example 1 and Example 3 are both correct.



Example 3

The NIST Technical Advisor to the Weighing Sector requested the Weighing Sector consider an alternate proposal shown in the "Recommendation" section above. This alternate proposal would amend Note 3 in Table S.6.3.b to eliminate the need for a definition of reading face. It would also closer align U.S. terminology with that used in OIML R 76 "Non-automatic Weighing Instruments" paragraph 7.1.4 Presentation of descriptive markings, which states the following:

> 7.1.4 Presentation of descriptive markings
> The descriptive markings shall be indelible and of a size, shape and clarity allowing easy reading. They shall be grouped together in a clearly visible place either on a descriptive plate fixed to an instrument or, on a part of the instrument itself.
>
> The markings:
> Max …
> Min …
> e …
> and d if d =/ e
> shall also be shown near the display of the result if they are not already located there (*Technical Advisor Note:* The markings may need to be repeated near the result if they are on a plate or location that is not near the weight display, or if the markings are on separable elements). It shall be possible to seal the plate bearing the descriptive markings unless its removal will result in its destruction. If the data plate is sealed, it shall be possible to apply a control mark to it.

The NIST Weights and Measures Division commented that it is concerned that the proposal deviates from the intent of General Code paragraph G-S.5.2.4 Values that specifies that values shall be adequately defined and placed with reference to the indications as close as practicable. Currently as written Note 3 is not in conflict with the General Code paragraph G-S.5.2.4. Values. However, the proposal submitted by the NTEP laboratories does create a conflict since the markings may not be placed as close as practical to the weight display.

The Scale Manufacturers Association supports the Weighing Sector's proposal, but asks for further clarification on the meaning of the phrase "already apparent by the design."

320-6 N.1.3.1. Bench or Counter Scales, N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel–Load Weighers, and Portable Axle-Load Weighers, and Appendix D; Definitions of Bench Scale and Counter Scale

Source: National Type Evaluation Technical Committee (NTETC) Weighing Sector

Recommendation: Delete paragraph N.1.3.1. and renumber subsequent paragraphs as follows:

N.1.3. Shift Test.

~~**N.1.3.1. Bench or Counter Scales. – A shift test shall be conducted with a half-capacity test load centered successively at four points equidistant between the center and the front, left, back, and right edges of the load-receiving element.**~~

N.1.3.~~2~~1. Dairy-Product-Test Scale.

.
.
.

N.1.3.~~7~~6. Vehicle On-Board Weighing Systems.

Renumber and amend paragraph N.1.3.8. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel–Load Weighers, and Portable Axle-Load Weighers as follows:

N.1.3.~~8~~7. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. A shift test shall be conducted using the following prescribed test loads and test patterns.

(a) For **~~livestock~~** scales**~~, the~~** **with a nominal capacity greater than 150 kg (300 lb), a** shift test load **~~shall not exceed one-half the rated section~~** **may be conducted by either using one-third nominal** capacity **~~or one-half the rated concentrated load~~** **test load centered as nearly as possible at the center of each quarter of the load-receiving element as shown in Figure 1 below, or by using one-quarter nominal** capacity**~~, whichever is applicable. A shift~~** **test ~~shall be conducted using either:~~** **load centered as nearly as possible, successively over each corner of the load-receiving element as shown in Figure 2 below.**

(~~a~~b) **~~A one-quarter~~** **For scales with a** nominal capacity **of 150 kg (300 lb) or less, a shift** test load **shall be conducted using one-third nominal capacity test. The ~~centered as nearly as possible, successively over each main~~** load **shall be applied centrally in the segment if a single weight is used, or applied uniformly over the segment, if several weights are used.~~support as shown in the diagram below; or~~**

(~~b~~c) **~~A one-half nominal capacity~~** **For livestock scales the shift** test load **~~centered as nearly as possible, successively at the center of each quarter of the load-receiving element~~** **shall not exceed one-half the rated section or concentrated load capacity using the prescribed test pattern** as shown in **~~the diagram~~** **Figure 1, or one-quarter the section or concentrated load capacity as shown in Figure 2** below.

(Added 2003)

Figure 1

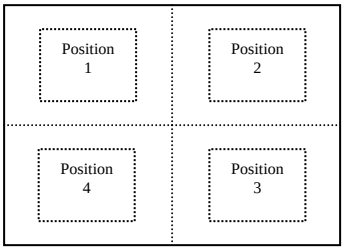
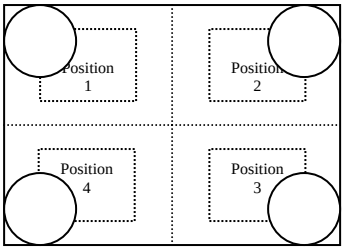


Figure 2



= Load Bearing Point

(Amended 1987**, ~~and~~** 2003**, and 200X)**

Delete Appendix D definitions for "bench scale" and "counter scale" as follows:

~~bench scale. See "counter scale."[2.20]~~

~~counter scale. One that, by reason of its size, arrangement of parts, and moderate nominal capacity, is adapted for use on a counter or bench. Sometimes called "bench scale."[2.20]~~

The Central Weights and Measures Association (CWMA) recommends an alternate proposal to modify paragraph N.1.3.8. as follows:

N.1.3.~~8~~7. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. A shift test shall be conducted using the following prescribed test loads and test patterns.

(a) For **~~livestock~~** scales**~~, the~~** **with a nominal capacity greater than 150 kg (300 lb) a** shift test load **~~shall not exceed one-half the rated section~~** **may be conducted by either using one-third nominal** capacity **~~or one-half the rated concentrated load~~** **test load centered as nearly as possible at the center of each quarter of the load-receiving element as shown in Figure 1 below, or by using one-quarter nominal**

capacity**~~, whichever is applicable. A shift~~** test **~~shall be conducted using either:~~** load centered as nearly as possible, successively over each corner of the load-receiving element as shown in Figure 2 below.

(~~a~~b) ~~A one quarter~~ For scales with a nominal capacity **of 150 kg (300 lb) or less, a shift** test load **shall be conducted using one- third nominal capacity test. The ~~centered as nearly as possible, successively over each main~~** load **shall be applied centrally in the segment if a single weight is used, or applied uniformly over the segment, if several small weights are used ~~support~~ as shown in ~~the diagram~~ Figure 1 below~~; or.~~**

(~~b~~c) ~~A one-half nominal capacity~~ For livestock scales the shift test load **~~centered as nearly as possible, successively at the center of each quarter of the load-receiving element~~ shall not exceed one-half the rated section or concentrated load capacity using the prescribed test pattern** as shown in **~~the diagram~~ Figure 1, or one-quarter the section or concentrated load capacity as shown in Figure 2** below.

(Added 2003)

(Amended 1987**, ~~and~~** 2003**, and 200X)**

Figure 1

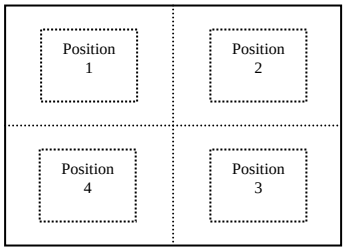
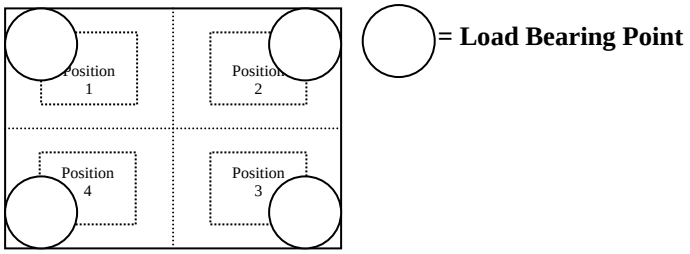


Figure 2



Discussion: The Weighing Sector requests the Committee revisit a 2003 Weighing Sector proposal that is newly revised to clarify the appropriate shift test pattern and test loads for bench/counter scales and other platform type scales. Currently, bench and counter scale shift tests are conducted with a half capacity test load centered successively at four points equidistant between the center and the front, left, back, and the right edges of the load-receiving element. Other platform scale shift tests are conducted with a one-half capacity test load centered, as nearly as possible, successively at the center of each quadrant.

The item was withdrawn from the 2004 S&T Agenda because the Committee agreed the proposal required more work to refine the definitions of bench/counter device types and develop an appropriate shift test procedure that is aligned with OIML requirements. Guidelines on how to clearly distinguish the different device types would allow the weights and measures field official to proceed with the appropriate shift test without having to conduct further investigation into the device type.

The NTEP Participating Laboratories were requested to conduct a series of tests on scales currently under NTEP evaluation comparing shift test results between existing Handbook 44 shift test procedures and those procedures outlined in the proposal. It should be noted that the proposal does not permit corner testing for scales with a nominal capacity less than or equal to 150 kg. Corner testing is allowed within permissible load limits, if there are not enough test weights to perform the shift test, or if the scale has four load supports. Table 4 Minimum Test Weights requires that scales with a capacity of 150 kg or less have test weights up to 100 percent of the scale capacity.

The Western Weights and Measures Association (WWMA) heard comments from the Weighing Sector recommending that the proposal be an information or developing item until additional field test data is gathered to verify that the proposed test loads and positions are equivalent to existing test loads. NIST commented that there might be sufficient time prior to the NCWM Interim and Annual meetings to gather the data.

The WWMA recommends that shift test data comparing existing and the proposed test loads and positions be sent to Steve Cook, NIST Technical Advisor to the NTETC Weighing Sector at steven.cook@nist.gov, by fax at 301-926-0647 or mailed to NIST WMD, 100 Bureau Drive MS 2600, Gaithersburg, MD 20899-2600.

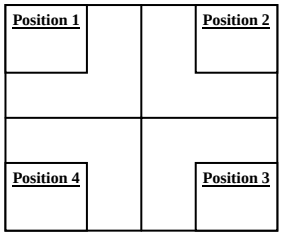
The CWMA recommends an alternate proposal as an information item to allow time for collecting data using the existing and proposed test load and test patterns.

The Northeastern Weights and Measures Association (NEWMA) recommend that NTEP Participating Laboratories gather data, performing tests both ways. On a general note regarding harmonization with OIML, NEWMA believes that there may be instances where OIML should harmonize with the U.S. Proposals to change U.S. requirements should not be made solely on the justification that a difference in a U.S. standard results in a "technical barrier" to trade.

The Southern Weights and Measures Association agrees that the proposal should remain an information item on the NCWM S&T Agenda until data is provided to demonstrate the impact on existing devices.

The Scale Manufacturers Association (SMA) supports the Weighing Sector's proposal, but questions whether Figure 2 is in error or is inconsistent with the proposed requirement that describes the location of the test load. Consequently, the SMA recommends an alternate Figure 2, where the test loads are positioned on the outside corners of the platform and the load bearing points are removed from the diagram because they are not relevant, as follows:

Figure 2



The SMA also notes that there is also inconsistency in the terminology in the proposal. Proposed paragraph N.1.3.7.(a) includes the term "quarter," whereas proposed paragraph N.1.3.7.(b) specifies the term "segment." The SMA recommends replacing both terms with the word "quadrant."

The SMA agreed that the Weighing Sector's proposal provides a shift test that is independent of the device's design. The proposal is an improvement over the corresponding R 76 requirement, which is design dependent. In keeping with the spirit of harmonization, the SMA recommends that NIST Weights and Measures Division submit a similar proposal to OIML.

320-7 Table 6 Maintenance Tolerances

Source: NIST Weights and Measures Division (WMD)

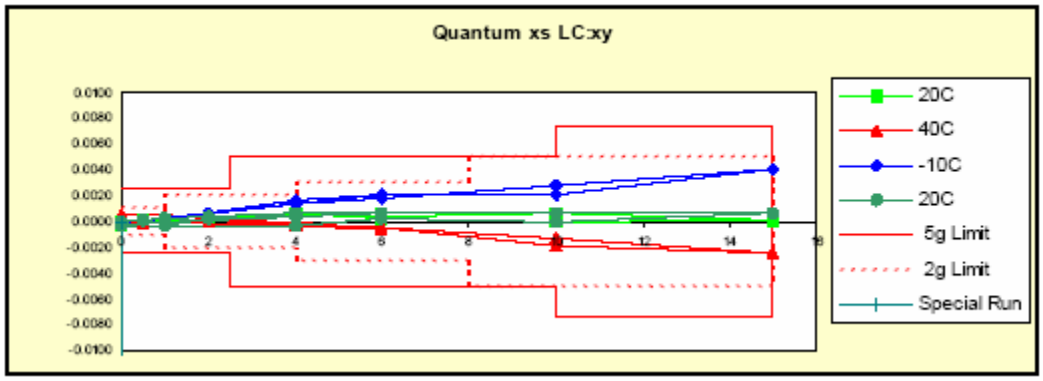
Recommendation: Amend Table 6 Maintenance Tolerances as follows:

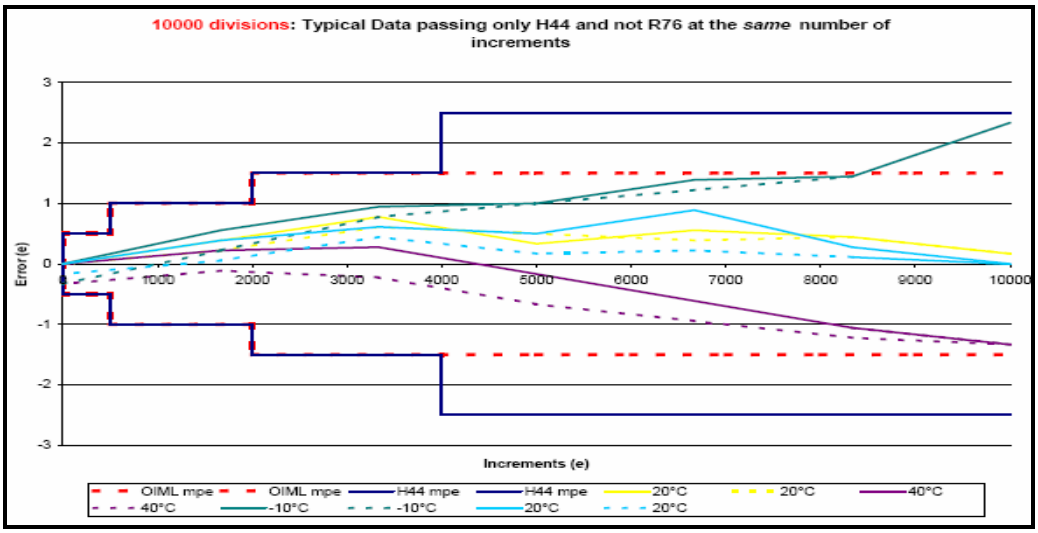
Table 6. Maintenance Tolerances (All values in this table are in verification scale divisions e)								
Tolerance in verification scale divisions e								
	1		2		3		5	
Class	Test Load							
I	0 - 50 000		50 001 -	200 000	200 001 +			
II	0 - 5 000		5 001 -	20 000	20 001 +			
III	0 - 500		501 -	2 000	2 001+ -	~~4 000~~	~~4 001 +~~	
IIII	0 - 50		51 -	200	201+ -	~~400~~	~~401 +~~	
III L	0 - 500		501 -	1 000	(Add 1d for each additional 500 d or fraction thereof)			

(Amended 200X)

Discussion: During the August 2003 meeting of the U.S. National Working Group (USNWG) for R 76 "Non-automatic Weighing Instruments," the group discussed the differences in the tolerance for Class III and IIII weighing instruments. The USNWG reconfirmed that the original intent of the step tolerances was to provide a relationship between scale accuracy and scale resolution. The USNWG agreed that Handbook 44 Class III and Class IIII tolerance should be aligned with OIML R-76. The manufacturers present reported that they build identically performing instruments and load cells for both U.S. and international markets.

In September 2004, Hobart Corporation provided additional "production data" comparing the different Class III tolerances as follows:





The chart data indicates that the production scales would comply with Handbook 44 Table 6 tolerances up to 10 000 e and OIML R 76 tolerances up to approximately 7000 e. Hobart Corporation also reports that many scales and load cells with an n_{max} greater than 5000 e would have difficulty in complying with the temperature effect on zero in both Handbook 44 and OIML R 76 standards.

The NIST Technical Advisor to the Weighing Sector requested the Weighing Sector discuss whether there is any technical justification to retain the Handbook 44 Accuracy Class III L tolerance or for proposing this tolerance be incorporated into OIML R 76. The Class III L tolerance structure in Handbook 44 deviates from the intent of step tolerances since that there is little relation of the value of the scale division (i.e., e = 20 lb resolution) to the accuracy required (i.e. ± 8 e at 80 000 lb maintenance tolerance). It should be noted that the tolerance values, zero-tracking limit, and motion detection requirements in Handbook 44 are roughly equivalent to a R 76 instrument when e = 50 lb.

The NTETC Weighing Sector withdrew this proposal from its agenda since the proposal was not developed in response to problems encountered with Publication 14 test procedures. The Weighing Sector recommends the NIST and USNWG proposal become either an information item or developing item that is reviewed by the regional weights and measures associations as well as the NCWM S&T Committee.

The Western Weights and Measures Association (WWMA) heard comments from members of the Weighing Sector that additional test data is needed to verify the effect of the proposed tolerances on Class III and IIII scales. The WWMA notes that data is required to determine the effect of the proposed tolerances on the apportionment errors for single and multiple load cell applications. The WWMA recommends that consideration be given to the international recommendations for the apportionment of error. The WWMA, like the Weighing Sector, agreed that the proposal should become an information item so that further analysis can be made on its possible impact to load cells, separable weighing elements, and existing scales.

The Central Weights and Measures Association (CWMA) recommends the proposal become an information item so further analysis can be made on its possible impact to load cells, separable weighing elements and existing scales. The CWMA notes that the Class III L scale tolerances for test loads greater than the proposed 1000 verification scale divisions (e) are in units of scale divisions (d) (i.e., Add 1d for each additional 500 d or fraction thereof). The CWMA questions whether these tolerances should be in e; however, this additional modification may add to the confusion.

The Southern Weights and Measures Association considered the proposal, but withdrew this item from its agenda.

The Scale Manufacturers Association (SMA) opposes the proposal. The SMA believes a change of this magnitude to harmonize requirements is premature and should not take precedence over other harmonization issues.

320-8 T.N.4.5. Time Dependence, T.N.4.5.1. Non-automatic Instruments Class II, III, and IIII Indications, T.N.4.5.2. Weighing Instrument Class III Indications, T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation, T.N.4.6.1. Reading Error, and T.N.4.6.2. MPE Using Apportionment Factors

Source: Western Weights and Measures Association (WWMA)

Recommendation: Amend paragraph T.N.4.5. as follows:

T.N.4.5. Time Dependence. ~~– At constant test conditions, the indication 20 seconds after the application of a load and the indication after 1 hour shall not differ by more than:~~

~~(a) one-half of the absolute value of the applicable tolerance for the applied load for class III L devices; and~~

~~(b) the absolute value of the applicable tolerance for the applied load for all other devices.~~
(Amended 1989 and 200X)

Add new paragraphs T.N.4.5.1. and T.N.4.5.2. as follows:

T.N.4.5.1. A non-automatic weighing instrument of class II, III, and IIII shall meet the following requirements at constant test conditions:

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing a load and the indication observed during the following 30 minutes shall not exceed 0.5 e.

(b) However, the difference between the indication obtained at 15 minutes and that at 30 minutes shall not exceed 0.2 e. If these conditions are not met, the difference between the indication obtained immediately after placing a load on the instrument and the indication observed during the following four hours shall not exceed the absolute value of the maximum permissible error at the load applied.

(c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for one half hour, shall not exceed 0.5 e.

For a multi-interval instrument, the deviation shall not exceed 0.5 e_1 (first weighing segment).

On a multiple range instrument, the deviation on returning to zero from Maxi (load in the applicable weighing range) shall not exceed 0.5 e_i (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e1 (interval of the first weighing range) during the following 5 minutes.
(Added 200X)

T.N.4.5.2. A weighing instrument of class III L shall meet the following requirements:

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing a load and the indication observed during the following 30 minutes shall not exceed 1.5 e.

(b) However, the difference between the indication obtained at 15 minutes and that at 30 minutes shall not exceed 0.6 e. If these conditions are not met, the difference between the indication obtained immediately after placing a load on the instrument and the indication observed during the following four hours shall not exceed the absolute value of the maximum permissible error at the load applied.

The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for one half hour, one-half of the absolute value of the applicable tolerance for the applied load for class III L devices.

(Added 200X)

Add new paragraphs T.N.4.6., T.N.4.6.1., T.N.4.6.2., T.N.4.6.3 and Table T.N.4.6.2 to include tolerances for load performance and zero repeatability that are aligned with OIML R 60.

T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation. – A load cell (force transducer) marked with an accuracy Class, shall meet the following requirements at constant test conditions:

T.N.4.6.1. - With a constant maximum load for the measuring range, Dmax, between 90 % and 100 % of maximum capacity, Emax, applied to the load cell, the difference between the initial reading and any reading obtained during the next 30 minutes shall not exceed the absolute value of the maximum permissible error (mpe) for the applied load (see N.4.6.2.). The difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes shall not exceed 0.15 times the absolute value of the mpe (see N.4.6.2.).

T.N.4.6.2. - The mpe for creep shall be determined from Table 5 using the following apportionment factors (pLC):

pLC = 0.7 for load cells marked with S (single load cell applications), and
pLC = 1.0 for load cells marked with M (multiple load cell applications)

(Added 200X)

Table T.N.4.6.2.
Maximum Permissible Errors (mpe) On Type Evaluation

Tolerance (mpe)	Load (m)			
	Class I	Class II	Class III	Class IIII
pLC x 0.5v	0 # 50 000v	0 # m # 5000v	0 # m # 500v	0 # m # 50v
pLC x 1.0v	50 001v # m # 200 000v	5001v # m # 20 000v	501v # m # 2000v	51v # m # 200v
pLC x 1.5v	200 001v – m	20 001v # m # 100 000v	2001v # m # 10 000v	201v # m # 1000v
	Load m, Class III L			
pLC x 0.5v	0 # m # 500v			
pLC x 1.0v	501v # m # 1000v*			

***Add 0.7 to the tolerance for each 500v of load or fraction thereof up to a maximum load of 10 000v for load cells marked with S.**
***Add 1.0 to the tolerance for each 500v of load or fraction thereof up to a maximum load of 10 000v for load cells marked with M.**

(Added 200X)

Technical Advisor's Note: "pLC" represents the apportionment factors
"V" represents the load cell verification interval

Background/Discussion: The NIST Weights and Measures Division acknowledges that this recommendation is a small step in the work to align U.S. and international requirements. Another possible alternative for aligning Handbook 44 and Publication 14 with OIML R 60 is to consider incorporating OIML R 60 chapters 1 through 7 by reference into Handbook 44 and OIML R 60 Annexes A through E into Publication 14. Handbook 44 and Publication 14 could further include paragraphs that state which requirements are not adopted, are different than, or are in addition to OIML R 60.

The following background information on the development of Handbook 44 Scales Code T.N.4.5. Time Dependence is provided by Mr. John Elengo (NIST Consultant) working on the comparison of Handbook 44, OIML R 76 "Non-automatic Weighing Instruments" and OIML R 60 "Load Cells".

Prior to the adoption of Handbook 44 paragraph T.N.4.5, the United States had not established any requirements for "creep." At that time, the OIML requirement for creep was based on a 4-hour period, which was considered excessive since the error is primarily contributed by the load cells used in a scale. Generally, the greatest amount of load cell creep occurs during a short period (minutes) immediately following the application of the load on the scale. After that point, the output becomes increasingly constant. Hence, the United States adopted a requirement which specifies a 1-hour period rather than a 4-hour period. Years later, during the revision of OIML R 60, it became evident that most international evaluation laboratories were not conducting the 4-hour test but a shorter one, and the creep proved to stabilize sufficiently during this shorter test. The assumption was made that the device would meet the 4-hour requirement. This assumption was verified by sample tests. Based on this experience and that gained in the international comparison of load cell evaluations, the OIML International Working Group for R 60 concluded that a 30-minute test is sufficient provided that, in addition to measuring the difference over a 30-minute period, the difference occurring in the last 10 minutes of this period be measured also. A more restrictive allowance than the total allowance for the 30-minute period is applied to the 10-minute period difference in order to assure that the creep is becoming increasingly constant and not increasing. OIML R 76 adopted the R 60 30-minute requirement. The requirement now applies not only to the load cell, but also to the instrument as a whole. If main components other than the load cell are a source of creep, they can be accounted for using the principle of apportionment of errors (including the assignment of fractions "pi" to those various separate main components of an instrument that can be evaluated separately). [refer to R 76-1, 3.5.4]

This proposal was discussed further at the 2004 NTEP Participating Laboratories meeting. The NTEP Laboratories agreed to forward a proposal to align Handbook 44 with R 76 and R 60.

The National Type Evaluation Technical Committee (NTETC) Weighing Sector withdrew this proposal from its agenda since it was not developed in response to problems with Publication 14 test procedures and due to time constraints. A member of the Sector also noted the proposal does not recognize tolerances for Class I scales.

The Western Weights and Measures Association recommends this item move forward as a voting item, but did not indicate its rationale for taking this position.

The Central Weights and Measures Association (CWMA) agreed the proposal is an issue for the Weighing Sector requiring further development. Consequently, CWMA recommends the proposal move forward as an information item.

The Northeastern Weights and Measures Association (NEWMA) recommends for consistency that the U.S. terms should be followed by the OIML equivalent terminology in parentheses. NEWMA also finds that this is an example of the need for revising Handbook 44 into separate sections for field verification and type evaluation test procedures.

The Southern Weights and Measures Association recommends that the proposal become a developing item on the NCWM S&T Agenda.

The Scale Manufacturers Association (SMA) recommends only an alternate modification to current Scales Code paragraph T.N.4.5. as follows:

> **T.N.4.5. Time Dependence. ~~– At constant test conditions, the indication 20 seconds after the application of a load and the indication after 1 hour shall not differ by more than: —~~ A time dependence test shall be conducted during type evaluation.**
>
> **~~(a) one-half of the absolute value of the applicable tolerance for the applied load for class III L devices; and~~**
>
> **~~(b) the absolute value of the applicable tolerance for the applied load for all other devices.~~**
>
> **(Amended 1989 and 200X)**

The SMA agrees with the proposed tolerances and recommends that the remaining proposed new paragraph be added NCWM Publication 14 through the Weighing Sector. The SMA agreed that Publication 14 requirements should be traceable to NIST Handbook 44; however, there is no need to overload Handbook 44 to provide that same traceability. The SMA agrees that its alternate proposal provides the necessary traceability.

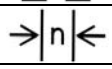
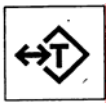
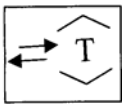
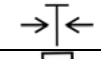
The SMA believes this is a harmonization issue. The SMA supports harmonization of U.S. and international requirements, but is concerned about the potential for unnecessarily increasing evaluation costs. The SMA does support this effort toward harmonization provided NTEP waives the resulting additional evaluation of existing devices.

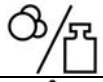
320-9 List of International Symbols Noted as Acceptable

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Add a new list of international symbols that are acceptable as follows:

List of Acceptable Abbreviations/Symbols

Device Application	Term	Acceptable	Not Acceptable
The following symbols are intended for operator controls, indications, and features. When they are also intended for the customer (including customer-operated devices) they cannot be used without additional descriptions, directions, or marks displayed or marked on the device.			
Operational Controls, Indications, Features:	**zero key or center of zero indicator**		**"z" alone is not acceptable unless term in defined on device**
	Off (Power)		
	On (Power)		
	On/Off (Power)		
	Print		
	Weighing		
	Scale n (n = 1. 2. ...)		
	Range n (n = 1, 2, ...)		
	High resolution		
	enter key		
	tare enter key		
Operational Controls, Indications, Features:	**tare clear key**		
	tare enter/tare clear		
	verify tare		
	Not for direct sales to the public		
	Combined zero/tare – See S.2.1.5. for additional information		
	Taring		
	Mass/Weight		
	Money		

Device Application	Term	Acceptable	Not Acceptable
The following symbols are intended for operator controls, indications, and features. When they are also intended for the customer (including customer-operated devices) they cannot be used without additional descriptions, directions, or marks displayed or marked on the device.			
	Price Per weight unit		
	Piece count		
	Counter		
	Read Counter		
	Print certificate		
	Information		

Discussion: The proposed list of symbols introduces the U.S. weights and measures official to a set of international symbols for use in marking operator controls, indications, and device features. Recognition and use of these symbols is consistent with efforts to harmonize U.S. and international device requirements.

Currently, the list of symbols is part of NTEP Publication 14 "Technical Policy, Checklists, and Test Procedures" for Weighing Devices. NTEP uses international symbol whenever possible. Style differences such as variations in the shape of arrows are acceptable.

The Scale Manufacturers Association (SMA) noted that these symbols are accepted internationally and registered with the DIN (Deutsches Institut FÜr Normung) (Germany) and IEC (International Electrotechnical Commission). SMA also pointed out that it is likely most symbols will be defined in the operator's manual since they identify controls and features used to operate the device.

The Southern Weights and Measures Association (SWMA) heard several concerns about the initial use of the international symbols. Most weights and measures officials do not have access to Publication 14 or other international documents. Consequently, it was suggested that NCWM and NIST post the list on their web sites and incorporate the symbols into bulletins, examination procedure outlines, and inspector training modules. The increased number of customer-operated devices would require additional markings or descriptions along with the symbols. This is especially true for symbols that represent Not for Direct Sales, Money, and Price per Unit Weight which are not well known in the United States. Once customers become familiar with the symbols, descriptions would no longer be necessary and the list of symbols would not be necessary in Publication 14.

The SWMA agreed that the proposed list of symbols would best serve field officials if placed in Handbook 44 as an appendix.

321 BELT-CONVEYOR SCALE SYSTEMS

321-1 UR.3.4. Diversion of Measured Product

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add new paragraph UR.3.4. as follows:

UR.3.4. Diversion of Measured Product. – There shall be no diversion of measured product. (Added 200X)

Discussion: The proposal intends to ensure that all product measured on the scale is delivered to the customer. There are several circumstances where the final amount of a commodity weighed on the system's scale can be affected by operator practices. For instance, taking commodity samples or movement of commodities on belt conveyors over long distances, where product slippage from the belt can result in product loss before the customer has custody of the commodity. Without records, any major spillage results in an inaccurate payment for delivered product. The chain-of-custody of weighed material between the scale to the end point of a conveyor system should be maintained at all times. The diversion of a measured commodity by as much as 0.1 % becomes significant over a 10-year period and can affect royalty payments, taxes, and even have an environmental impact for some commodities.

Originally, the Western Weights and Measures Association (WWMA) and Central Weights and Measures Association (CWMA) considered an industry proposal to amend existing paragraphs UR.3.2. and UR.3.3. to address diversion of commodities by requiring this material be measured and recorded.

Previously weighed material spilled and left on the ground or hauled back to the raw storage pile (and likely reweighed) result in a loss to the buyer. The end result is no record of spillage and no credit given to the buyer.

The WWMA heard comments from a manufacturer that supported the concept, but found the "measurable diversion of weighed material" somewhat ambiguous. The WWMA believes that the intent of the proposal could be better stated and simplified. Consequently, the WWMA modified industry's proposal as shown in the recommendation above by only adding a new paragraph UR.3.4. Diversion of Measured Product rather than suggesting changes to existing paragraphs UR.3.2. and UR.3.3..

The CWMA withdrew the industry's proposal from its agenda because no data was provided to demonstrate there is an issue with diverted product. The CWMA also noted that the use of the term "diverted" implies fraud.

322 AUTOMATIC BULK WEIGHING SYSTEMS

322-1 Tolerances

Source: Carryover Item 322-1. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2002 agenda.)

Recommendation: Delete paragraphs T.1.4., T.2., T.2.1, T.3.2. and T.3.3.as follows:

~~**T.1.4. To Tests Involving Digital Indications or Representations. - To the tolerances that would otherwise be applied, there shall be added an amount equal to one-half the value of the scale division. This does not apply to digital indications or recorded representations that have been corrected for rounding using error weights.**~~

~~**T.2. Minimum Tolerance Values. - The minimum tolerance value shall not be less than half the value of the scale division.**~~

~~**T.2.1. For Systems used to Weigh Construction Materials. - The minimum maintenance and acceptance tolerance shall be 0.1 % of the weighing capacity of the system, or the value of the scale division, whichever is less.**~~

~~**T.3.2. For Systems used to Weigh Grain. - The basic maintenance tolerance shall be 0.1 % of test load.**~~

~~**T.3.3. For all Other Systems. - The basic maintenance tolerance shall be 0.2 % of test load.**~~

Renumber paragraph T.3. and renumber and modify T.3.1. as follows:

T.~~3~~.2. Basic Tolerance Values.

T.~~3~~.2.1. Acceptance Tolerance. -The basic acceptance tolerance shall be one-half the basic maintenance tolerance**, but never less than 1 division.**
(Amended 200X)

Add new paragraphs T.2.2., T.2.3., and T.2.3.1. and Table 1. and Table 2. as follows:

T.2.2. General. - The tolerance applicable to devices not marked with an accuracy class shall have the tolerances applied as specified in Table 1. below.

Table 1. Tolerance for Unmarked Scales			
Type of Device	**Tolerance**	**Decreasing Load Multiplier**	**Other applicable Requirements**
Grain Hoppers	**Class III, T.2.3 (table 2)**	**1.0**	**T.2.1., T.2.3.1**
Other Systems	**Class III L, T.2.3 (table 2)**	**1.0**	**T.2.1., T.2.3.1**

(Added 200X)

T.2.3. Tolerances Applicable to Devices Marked III or III L.

T.2.3.1. Maintenance Tolerance Values - The maintenance tolerance values are specified in Table 2 below.

Table 2. Maintenance Tolerance for Marked Scales (All values in this table are in scale divisions) Tolerance in scale divisions				
	1	**2**	**3**	**5**
Class	**Test Load**			
III	**0 – 500**	**501 - 2000**	**2001 – 4000**	**4001 +**
III L	**0 – 500**	**501 - 1000**	**(Add 1d for each additional 500 d or fraction thereof)**	

(Added 200X)

Add a new footnote to Section 2.20 Scales Code Table 1.1.1. Tolerances for Unmarked Scales as follows:

[x] Automatic bulk weighing systems see Section 2.22 for specifications and tolerances.
(Added 200X)

Discussion: Since 2002, the Committee has considered a proposal to change the automatic bulk weighing systems tolerances from a percentage basis to division values, which are based on the device's accuracy class. The proposal was intended to align tolerances in the Automatic Bulk Weighing Systems (ABWS) Code and the Scales Code.

The Committee has kept the proposal as an information item to allow interested parties sufficient time to work through issues surrounding the permissible system errors and other concerns. The U.S. Grain Inspection, Packers and Stockyard Administration (GIPSA) indicated opposition to the proposed tolerances because of concerns about the allowable cumulative error in a system's performance. GIPSA also noted that NEWMA indicated that some asphalt and cement plants use hopper scales that are considered ABWS by officials because these devices are capable of weighing single and multiple drafts, while other jurisdictions classify these devices as hopper scales, which are held to different tolerances. During past discussions, the Committee questioned whether training would help clarify any confusion that exists over which systems fall under the ABWS Code. The Committee noted that a hopper modified to include a controller and is only capable of weighing several drafts is an automated hopper, not an ABWS.

Grain Inspection, Packers and Stockyard Administration Position

In 2004, GIPSA submitted the following position to the Committee for consideration. In 1986 when the ABWS Code was established, those systems were recognized as a special type and design. The tolerances for grain scales in this code were kept as a percentage so they would be proportional throughout the entire test load. The proposed step tolerance structure is not proportional throughout the system's entire weighing range and would double the allowable tolerance for test loads in some scale configurations. GIPSA believes the proposed structure might encourage scale owners to inappropriately select a scale configuration that permits the greater tolerance. Furthermore, under the proposed step

tolerance structure, if some weights and measures jurisdictions do not apply the tolerance to the grain and test weights (test load) when conducting substitution tests, then the allowable error doubles up through the entire system's capacity.

Since 1986, the ABWS Code percentage tolerance for grain scales has served the grain industry well and there has not been any interest in changing the tolerance structure. In view of GIPSA's 17-year history of successful implementation of the ABWS Code in grain scale applications and the high level of understanding and acceptance of the code, GIPSA believes that the rationale behind NEWMA's proposal does not warrant a change to grain scale tolerances. GIPSA provided three tables to demonstrate its position. The tables are intended to show a comparison of a 0.1 % tolerance and Table 6 Accuracy Class III tolerance applied to a 120 000 lb x 20 lb and 50 000 lb x 10 lb device, given a specific amount of test weights and using the substitution test method during the increasing load test.

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances
120 000 lb x 20 lb ABWS

Indicated Grain Weight (lb)	Error In Grain Weight (lb)	Actual Grain Weight (lb)	Test Weights (lb)	Indicated Weight (lb)	Error for Indicated Weigh-ment (lb)	0.1 % Tolerance on Test Weights (lb)	Error on Accum-ulated Test Load (lb)	0.1 % Tolerance on Accumu-lated Test Load (lb)	n	Class III Tolerance On Test Weights (lb)	Class III Tolerance on Accumulated Test Load (lb)
0	0	0	12000	11980	-20	20	-20	20	600	40[b]	40[b]
11980	-20	12000	12000	23960	-20	20	-40[a]	24	1200	40[b]	40[b]
23960	-40	24000	12000	35960	0	20	-40[a]	36	1800	40[b]	40[b]
35960	-40	36000	12000	47980	+20	20	-20	48	2400	40[b]	60[b]
47980	-20	48000	12000	60000	+20	20	0	60	3000	40[b]	60
60000	0	60000	12000	72000	0	20	0	72	3600	40[b]	60[c]
72000	0	72000	12000	84020	+20	20	+20	84	4200	40[b]	100[b]
84000	+20	83980	12000	96000	0	20	+20	96	4800	40[b]	100[b]
96020	+20	96000	12000	108040	+20	20	+40	108	5400	40[b]	100[c]
107900	+40	107860	12000	119920	+20	20	+60	120	6000	40[b]	100[c]

[a] Error exceeds the current allowable 0.1 % tolerance
[b] Value expressed as an Accuracy Class III tolerance is greater than the current ABWS Code 0.1 % tolerance
[c] Value expressed as an Accuracy Class III tolerance is less than the current ABWS Code 0.1 % tolerance

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances
50 000 lb x 10 lb ABWS

Indicated Grain Weight (lb)	Error In Grain Weight (lb)	Actual Grain Weight (lb)	Test Weights (lb)	Indicated Weight (lb)	Error for Indicated Weigh-ment (lb)	0.1 % Tolerance on Test Weights (lb)	Error on Accum-ulated Test Load (lb)	0.1 % Tolerance on Accumu-lated Test Load (lb)	n	Class III Tolerance On Test Weights (lb)	Class III Tolerance on Accumulated Test Load (lb)
0	0	0	5000	5010	+10	10	+10	10	500	10	10
5010	+10	5000	5000	10010	0	10	+10	10	1000	10	20[b]
10020	+10	10010	5000	15000	-20[a]	10	-10	15	1500	10	20[b]
15020	-10	15030	5000	20020	0	10	-10	20	2000	10	20
20020	-10	20030	5000	25010	-10	10	-20	25	2500	10	30[b]
25030	-20	25050	5000	30010	-20[a]	10	-40[a]	30	3000	10	30
30030	-40	30070	5000	35030	0	10	-40[a]	35	3500	10	30[c]
35030	-40	35070	5000	40030	0	10	-40	40	4000	10	30[c]
40040	-40	40080	5000	45040	0	10	-40	45	4500	10	50[b]
45040	-40	45080	5000	50030	-10	10	-50	50	5000	10	50

[a] Error exceeds the current allowable 0.1 % tolerance
[b] Value expressed as an Accuracy Class III tolerance is greater than the current ABWS Code 0.1 % tolerance
[c] Value expressed as an Accuracy Class III tolerance is less than the current ABWS Code 0.1 % tolerance

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances
For Typical ABWS Used in Grain Weighing

Scale Capacity x division	Test Load (lb)	Current Handbook 44 Tolerance (lb)	Proposed Accuracy Class III Tolerances [accumulated test load tolerance] (lb)
5,000 lb x 0.5 lb	500	0.5	1
	5,000	5	2.5 [10]
5,000 lb x 1 lb	500	1	1
	5,000	5	5 [10]
5,000 lb x 2 lb	500	2	2
	5,000	5	6 [20]
10,000 lb x 1 lb	1,000	1	2
	10,000	10	5 [20]
10,000 lb x 2 lb	1,000	2	2
	10,000	10	10 [20]
10,000 lb x 5 lb	1,000	5	5
	10,000	10	10 [50]
20,000 lb x 2 lb	2,000	2	4
	20,000	20	5 [40]
20,000 lb x 5 lb	2,000	5	5
	20,000	20	15 [50]
30,000 lb x 5 lb	3,000	5	10
	30,000	30	25 [100]
30,000 lb x 10 lb	3,000	10	10
	30,000	30	30 [100]
50,000 lb x 5 lb	5,000	5	10
	50,000	50	25 [100]
50,000 lb x 10 lb	5,000	10	10
	50,000	50	50 [100]
50,000 lb x 20 lb	5,000	20	20

GIPSA Comparison of 0.1 % Tolerance to Accuracy Class III Tolerances For Typical ABWS Used in Grain Weighing			
Scale Capacity x division	Test Load (lb)	Current Handbook 44 Tolerance (lb)	Proposed Accuracy Class III Tolerances [accumulated test load tolerance] (lb)
	50,000	50	60 [200]
75,000 lb x 10 lb	7,500	10	20
	75,000	75	50 [200]
75,000 lb x 20 lb	7,500	20	20
	75,000	75	60 [200]
100,000 lb x 10 lb	10,000	10	20
	100,000	100	50 [200]
100,000 lb x 20 lb	10,000	20	20
	100,000	100	100 [200]
100,000 lb x 50 lb	10,000	50	50
	100,000	100	100 [500]
120,000 lb x 20 lb	12,000	20	40
	120,000	120	100 [400]
120,000 lb x 50 lb	12,000	50	50
	120,000	120	150 [500]

Western Weights and Measures Association (WWMA) Position

The WWMA heard no comments on the proposal, but remains concerned about the potential cumulative effect of allowable errors that are the result of the proposed step tolerances.

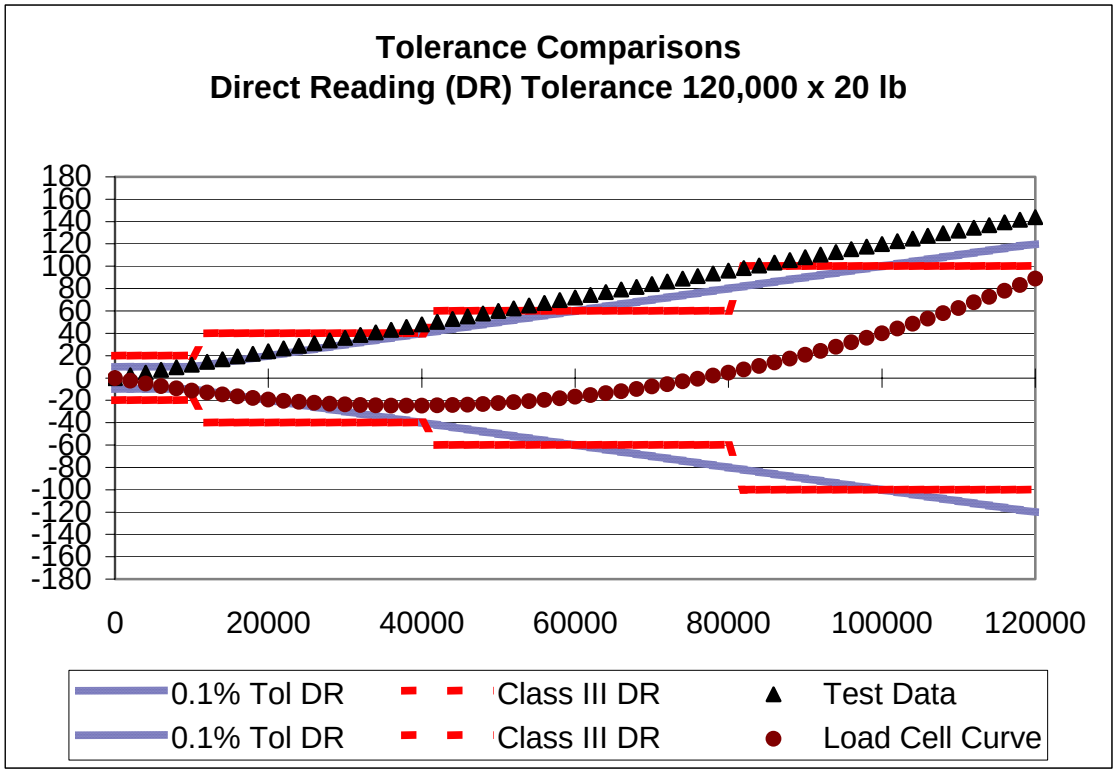
Northeastern Weights and Measures Association (NEWMA) Position

NEWMA does not intend the proposal to require that operators of grain hopper scales replace their scales. NEWMA indicated there are apparent similarities between a 0.1 % and Accuracy Class III tolerance structures. NEWMA finds the tolerance structures are closely aligned, yet slightly different at various points. Consequently, it will always be possible to cite borderline examples where the test results at selective test loads may produce differing “pass” or “fail” results on a particular scale. This difference can work both ways where application of percent tolerances may pass a scale when Class III tolerances would fail that same device and vice versa.

NEWMA believes the 0.1 % tolerance structure in the current ABWS Code emphasizes accuracy primarily at the device’s lower capacity ranges. Manufacturers may indicate they are only concerned with a device’s performance at 500 d because if the device can pass at that point then it will pass throughout its entire capacity range. In contrast, the Class III tolerance structure places an emphasis on accuracy at the higher scale capacities, which is typically where the scale will be used. For example, at 4000 d the Class III tolerance is actually 1 d tighter than the 0.1 % tolerance. NEWMA finds these differences to be minor.

The concerns heard in 1986 about a less stringent tolerance for loads slightly above 500 d are not the same today because officials know how to properly conduct a substitution test. This is due, in part, to work in 2003 to clarify the definition for substitution test.

NEWMA provided the graph shown below to demonstrate the slight differences in the scale tolerance structures. The graph includes a plotted scale error of 0.12 %. NEWMA notes that it is unlikely that either tolerance structure would result in a failure rate until the test load exceeds 50 000 lb. The graph also includes a “load cell curve” that often appears on high resolution electronic scales like those in the GIPSA examples. NEWMA contends that, if you examine the population rather than the individual scale, the overall outcome of a test will be the same in the end for both tolerance structures. It also is unlikely that device users could take advantage of the tolerance if adjustments are made as close as practicable to zero error.



NEWMA also contends that there is no significant difference in the design of a manual hopper scale or a hopper scale used in an ABWS. NEWMA does not see manufacturers offer two different models of hopper or use different load cells based on whether or not a device is evaluated under the Scales Code or ABWS Code. History seems to indicate that the 0.1 % tolerance was retained in the ABWS Code in 1986 not because these were unique devices, but primarily because it was too great of a change for many at that time. History also indicates that the 5 d tolerance step for Accuracy Class III was a compromise to those who did not want to lose the 0.1 % tolerance structure and the use of scales with small division sizes. NEWMA believes that in 1986 a majority of ABWSs were mechanical analog devices, whereas today they are predominantly electronic.

NEWMA noted that the change in applicable tolerances from 0.1 % tolerance to an Accuracy Class tolerance structure did not seem to pose a significant problem for a large number of other weighing devices. Between 1990 and 1993, the NCWM made a number of changes to the Scales Code Table T.1.1. Tolerances for Unmarked Scales. These changes brought most of the unmarked scales, initially grand fathered in 1986 at a 0.1 % tolerance, under the Class III tolerance structure. As part of those changes the old decreasing load multiplier was reduced from 1.5 to 1.0. NEWMA does not remember a significant increase in device rejections following these transition periods.

NEWMA cites the major reason for its proposal is to make the application of tolerances easier for the inspector. NEWMA finds that applying a percent tolerance is difficult and somewhat subjective, since the official is faced with the difficulty in understanding and correctly applying the minimum tolerance and in dealing with rounding errors at intermediate test loads. NEWMA believes that, if you polled any group of officials and asked them to make a tolerance chart for any given ABWS device, you will probably get many different answers. NEWMA notes that in GIPSA's first example there is a tolerance of 40 lb for a 24 000 lb test load. However, the actual tolerance is 34 lb, if using direct reading. Should one round up or round down? What if the test load is 20 000 lb with a 30 lb tolerance, which is right at the break point between graduations? In this instance is the tolerance 20 lb or 40 lb? Any confusion is eliminated under the proposed Accuracy Class tolerance structure.

NEWMA offers what it believes is one more compelling reason to move to Class III tolerance and that is international trade. The NCWM is embarking on a careful effort to consider harmonizing U.S. requirements with OIML requirements. NEWMA believes that all U.S. regulatory agencies should be part of this process to get the United States aligned with the rest of the world. If the U.S. system is better, then we should work together to change OIML standards.

If OIML requirements are as good as U. S. requirements, then there is compelling reason under the OIML Treaty to be part of the world community. Adopting Class III Tolerance would bring the United States closer to international standards. Harmonization not only affects the sale of measuring devices, but also their use. The United States exports a great deal of grain to the world. Why shouldn't the United States and the rest of the world use a single standard to verify the measurement of grain at all levels of commerce.

NEWMA forwarded to the S&T Committee a new survey developed by the New York Weights and Measures Association. The survey asks participants to respond by calculating, where appropriate, the total test load, scale error, and tolerances for five test points on two systems (asphalt plant and grain applications). The survey of the States is intended to provide a "snap-shot" of how jurisdictions apply ABWS tolerances. The results from this survey could be used to determine the future disposition of this item. NEWMA heard the suggestion to consider hopper scales, other than grain, as Class III devices, thus making the ABWS Code only applicable to grain ABWSs under the jurisdiction of GIPSA. However, this recommendation would require additional revision to the ABWS Code.

NEWMA continues to welcome the opportunity for more discussion with the S&T Committee and GIPSA. NEWMA strongly believes that the very minor differences in tolerance applications on a few borderline cases does not justify having a unique code for a device that is identical in design and performance to devices evaluated under the Scales Code. Anyone wishing to discuss this proposal with NEWMA should contact Bill Wilson (Clinton County, New York) at 518-565-4681, by fax at 518-565-4694, or by email at wilsonperu@aol.com or Ross Andersen (New York) at 518-457-3146, by fax at 518-457-5693, or by email at ross.andersen@agmkt.state.ny.us.

The Central Weights and Measures (CWMA) Position

The CWMA is concerned that the proposal may not have technical merit and is the result of each regulatory agencies' preference for a particular code format. The CWMA is also concerned that adopting the proposal will effect step tolerances to the point that older devices with an n_{max} greater than 4000 d will not comply.

NCWM S&T Committee Position

In July 2004, the Committee stressed that a system, to be considered an ABWS, must meet all ABWS Code specifications such as interlocks and overfill sensors as well as performance requirements. There is ongoing work to harmonize many U.S. requirements with OIML standards; however, R 107 "Discontinuous Totalizing Automatic Weighing Instruments (Totalizing Hopper Weighers)," unlike the ABWS Code, requires a material test. The U.S. and OIML procedures for substitution tests consider the use of error weights to determine the scale's true performance and to avoid introducing uncertainties in the test process. If error weights are not used, the potential does exist for introducing additional error when the known test load falls between tolerance break points in the accuracy class structure.

The Committee heard testimony from GIPSA that all issues that might arise from the proposal have not been examined, especially those affecting the grain industry. GIPSA understands the need to harmonize U.S. and OIML requirements, but recommended a closer examination of the grain industry's concerns. The Committee believes that a U.S. National Working Groups (USNWG) should be given serious consideration as a possible forum to work on suitable ABWS tolerances. USNWGs bring public and private sector representatives together that have experience and expertise in a particular device area to work to resolve items on a limited and device specific agenda. NIST USNWGs have made great strides and had multiple successes in tackling many device specific issues. The Committee decided to keep the proposal an information item to allow GIPSA, NEWMA, the grain industry, and all other parties affected by the proposed changes to the ABWS tolerances additional time to compare data and come to an amenable and appropriate solution for ABWS tolerances.

For more background information, refer to the 2002, 2003, and 2004 S&T Final Report.

330 LIQUID-MEASURING DEVICES

330-1 S.1.6.1.1. Indication of Delivery; Suppression Until Normal Delivery Pressure

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify H44 Sec. 3.30. Paragraph S.1.6.1. Indication of Delivery and add new paragraph S.1.6.1.1. for inhibiting measurement and indication of delivery as follows:

S.1.6.1. Indication of Delivery. - The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

However, the first 0.03 L (or 0.009 gal) of a delivery and its associated total sales price need not be indicated.

S.1.6.1.1. – After the suppression of up to 0.03 L (or 0.009 gal) the measurement and indication of delivered quantity, and the indication of total price on a digital device shall be inhibited until the fueling position reaches normal delivery pressure.
(Amended 1982 and 200X)

Discussion/Background: At the 2004 Sector Meeting, Maryland Weights and Measures stated that as the price for motor fuel nears or exceeds $2.00 per gallon, the number of complaints it receives regarding computer jump have increased. WMD has received numerous calls from jurisdictions related to this problem. It appears that the actual amount of jump or meter creep occurring because of internal pressure changes related to changes in temperature has not increased. However, at the higher unit prices this relatively small meter creep creates a delivery indication of several cents. Maryland and WMD provided a proposal to eliminate the indication of computer jump for the Sector to consider. The Sector agreed with the proposal in principle, but recommended some changes to the language, as shown above and agreed to forward it to the NCWM and Southern Weights and Measures Association (SWMA) S&T Committees for consideration.

At its October 2004 Meeting, the SWMA heard no opposition to the Measuring Sector proposal. One official asked if a similar requirement should be added to the Handbook 44 Section 3.30. Liquid-Measuring Devices, for wholesale meters and to Section 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices. The SWMA agreed to forward the proposal to the Committee with the recommendation that it be a voting item on the 2005 NCWM S&T Agenda. The SWMA also recommends that the Committee consider adding similar requirements to Handbook 44 Sections 3.30. and 3.32. as appropriate.

330-2 N.4.2.2. Retail Motor-Fuel Devices

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify H44 Sec. 3.30 paragraph N.4.2.2. Retail Motor-Fuel as follows:

N.4.2.2. Retail Motor-Fuel Devices.

(a) Devices with a flow-rate capacity less than ~~100~~ 115 L (~~25~~ 30 gal) per minute shall have a "special" test performed at the slower of the following rates:

(1) 19 L (5 gal) per minute, or

(2) the minimum discharge rate marked on the device, or

(3) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting provided it is not less than the marked minimum flow rate.

(b) Devices marked with a flow-rate capacity ~~100~~ 115 L (~~25~~ 30 gal) or more per minute shall have a "special" test performed at the slowest of the following rates:

(1) the minimum discharge rate marked on the device, or

(2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting provided it is not less than the marked minimum flow rate.

Alternate Recommendation: NIST Weights and Measures Division (NIST/WMD) recommends modifying Handbook 44 Sec. 3.30 Paragraph N.4.2.2. Retail Motor-Fuel as follows:

N.4.2.2. Retail Motor-Fuel Devices.

(a) Devices without a marked minimum flow-rate ~~capacity less than 100 L (25 gal) per minute~~ shall have a "special" test performed at the slower of the following rates:

(1) 19 L (5 gal) per minute, or

(2) ~~the minimum discharge rate marked on the device, or~~

(~~3~~) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.

(b) Devices marked with a minimum flow-rate ~~capacity 100 L (25 gal) or more per minute~~ shall have a "special" test performed at or near the marked minimum flow rate. ~~slowest of the following rates:~~

~~(1) the minimum discharge rate marked on the device, or~~

~~(2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting.~~

Discussion/Background: At its October 2004 Meeting, the (NTETC) Measuring Sector discussed a test scenario in which a RMFD with marked flow rates of 60 gpm maximum and 12 gpm minimum, the actual flow rate on the lowest setting of the automatic nozzle was 6 gpm. The laboratory posed the following questions regarding this situation.

If a 10-gal test measure is used, what is the appropriate tolerance applicable? Table T.2. in the LMD Code stipulates that the special test tolerance is 0.5 %. This would equate to 11.55 cubic inches on a ten-gallon test draft; however, there is a footnote that states that the applicable acceptance tolerance when using a 10-gallon test draft is 5.5 cubic inches. Which tolerance should be applied during an NTEP evaluation? If a prover with a capacity greater than 10 gallons is used, would it provide a tolerance advantage over tests conducted with a 10-gallon test measure?

S.4.4.1. requires that RMFDs with a designed maximum flow rate of 30 GPM or greater be marked with a minimum and maximum flow rate. RMFDs with a designed maximum flow rare of less than 30 GPM are not required to have a maximum and minimum flow rate mark, but such marking is not precluded. N.4.2.2 (b) in the LMD Code states **"**Devices marked with a flow-rate capacity of 100 L (25 gal) or more per minute, shall have a "special" test performed at the slowest of the following rates: (1) the minimum discharge rate marked on the device, or (2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting." If a RMFD is marked with a minimum flow rate is it appropriate to operate the device below the marked minimum flow rate?

The Sector agreed that officials should not test below the minimum flow rate marked on the device. The Sector also agreed that the flow rate of 25 gpm in N.4.2.2. should be changed to 30 gpm to agree with the marking requirements in S.4.4.1. Discharge Rates. The Sector agreed to forward the proposal shown above to the NCWM and Southern Weights and Measures Association (SWMA) for consideration.

At its October 2004 Meeting the SWMA heard concerns with the proposed changes to N.4.2.2. Retail Motor-Fuel Devices (a) (3) and (b) (2) and recommended that officials not test at a flow rate less than the minimum flow rate marked on a device. As presented there appears to be a conflict with other requirements in N.4.2.2. The SWMA agreed that the proposal should not be forwarded to the Committee.

Following the SWMA Meeting WMD developed the alternative recommendation shown above to address the concerns of the SWMA with the original Measuring Sector's proposal to modify N.4.2.2. The WMD recommends that the Committee consider the alternate recommendation, which eliminates any conflicting language from the paragraph.

Editor's note: G-UR.2.3. states "that equipment shall be operated only in the manner that is indicated by instructions on the equipment (minimum flow rate)." Some dispensers with a latch on the nozzle lever which when set at its lowest setting may cause the dispenser to operate below the marked minimum flow rate. The Conference may want to consider a User Requirement in the LMD Code that does not allow a latch on the nozzle to create this situation.

331 VEHICLE-TANK METERS

331-1 Recognition of Temperature Compensation

Editor's note: On Monday, January 24, 2005, (of the upcoming Interim Meeting) beginning at 1:00 p.m., the L&R and S&T Committees will hold a joint session to discuss a wide range of temperature compensation issues.

Source: Carryover Item 331-1 (This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2000 agenda.)

Recommendation: Modify Section 3.31. Vehicle-Tank Meters (VTM) Code by adding the following new paragraphs to recognize temperature compensation as follows:

S.2.4. Automatic Temperature Compensation for Refined Petroleum Products.

S.2.4.1. Automatic Temperature Compensation for Refined Petroleum Products. - A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C (60 °F), where not prohibited by State Law.

S.2.4.2. Provision for Deactivating. - On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate and record, if it is equipped to record, in terms of the uncompensated volume.

S.2.4.2.X. Gross and Net Indications - A device equipped with automatic temperature compensation shall indicate and record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. If both values cannot be displayed or recorded for the same test draft, means shall be provided to select either the gross or net indication for each test draft.

S.2.4.3. Provision for Sealing Automatic Temperature-Compensating Systems. - Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment may be made to the system.

S.2.4.4. Temperature Determination with Automatic Temperature Compensation. - For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) In the liquid chamber of the meter, or

(b) Immediately adjacent to the meter in the meter inlet or discharge line.

(Added 2004)

S.5.6. Temperature Compensation for Refined Petroleum Products. - If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recording representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).
(Added 2004)

N.4.1.3. Automatic Temperature-Compensating Systems for Refined Petroleum Products. - On devices equipped with automatic temperature-compensating systems, normal tests shall be conducted:

(a) by comparing the compensated volume indicated or recorded to the actual delivered volume corrected to 15 °C (60 °F); and

(b) with the temperature-compensating system deactivated, comparing the uncompensated volume indicated or recorded to the actual delivered volume.

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.
(Added 2004)

N.5. Temperature Correction for Refined Petroleum Products. - Corrections shall be made for any changes in volume resulting from the differences in liquid temperatures between the time of passage through the meter and time of volumetric determination in the prover. When adjustments are necessary, appropriate petroleum measurement tables should be used.
(Added 2004)

T.2.1. Automatic Temperature-Compensating Systems. - The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:

(a) 0.4 % for mechanical automatic temperature-compensating systems; and

(b) 0.2 % for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
(Added 2004)

UR.2.5. Temperature Compensation for Refined Petroleum Products.

UR.2.5.1. Automatic.

UR.2.5.1.1. When to be Used. - In a State that does not prohibit, by law or regulation, the sale of temperature-compensated product a device equipped with an operable automatic temperature compensator shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the responsible weights and measures jurisdiction.

[Note: This requirement does not specify the method of sale for product measured through a meter.]

UR.2.5.1.2. Invoices. - An invoice based on a reading of a device that is equipped with an automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15 °C (60 °F).
(Added 2004)

Discussion/Background: When this item was originally submitted, several officials reportedly were confused about the specific meter applications that are covered by an NTEP Certificate of Conformance for a meter that includes the temperature-compensation feature. The WWMA acknowledged that there are jurisdictions that permit temperature compensated deliveries in applications that are not addressed by NIST Handbook 44. Some states do not allow the use of automatic temperature compensation for the delivery of products using a VTM.

At the 2002 and 2003 NCWM Annual Meetings, this item did not pass or fail and it was returned to the Committee for further consideration.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) supported the proposal. One official said that the item should remain an information item until the Method of Sale Regulation in Handbook 130 requires the sale of petroleum products to utilize temperature correction to the standard reference temperature of 60 ºF. Another official stated that not having standards and test methods in the VTM code of Handbook 44 creates a hardship for officials in jurisdictions where temperature compensation is allowed: (e.g., utilized on VTMs delivering petroleum products) and urged the NCWM to adopt that proposal. The Committee agreed to present Item 331-1 for adoption at the 2004 NCWM Annual Meeting.

At the 2004 NCWM Annual Meeting, the Committee stated its position on Item 331-1 as follows:

The Committee believed that the Specifications, Test Notes, Tolerances, and User Requirements contained in the proposal are technically correct and provide both weights and measures officials and the NTEP laboratories with the proper criteria to use when evaluating a vehicle tank meter (VTM) with temperature compensation capability. The addition of this language in the VTM Code does not require, approve, nor solicit any jurisdiction to either prohibit or accept the use of temperature compensation in that jurisdiction. The Committee further stated that the adoption of a nationally accepted method of sale for temperature compensation by all jurisdictions will not be obtainable in the foreseeable future and encouraged each jurisdiction to adopt by either statute, rule, or regulation requirements that prohibit, permit, or require temperature compensation in their jurisdiction.

The Committee agreed that there were a sufficient number of states that needed the new requirements as an inspection tool to warrant adding the proposal to NIST Handbook 44 at that time without waiting for method of sale requirements to be added to NIST Handbook 130.

At the 2004 NCWM Annual Meeting, this item did not pass or fail and it was returned to the Committee for further consideration.

At its September 2004 Meeting, the Central Weights and Measures Association (CWMA) agreed with the Committee that nothing in this proposal requires a jurisdiction to permit or prohibit the sale of petroleum products that have been temperature compensated. The CWMA recognized the technical merit of the proposal and feels that requirements are needed in Handbook 44; however, the CWMA further agreed that this is a “method of sale” issue and that the proposal should be retained as an information item until an accompanying method of sale requirement is added to Handbook 130.

At its September 2004 Meeting, the Western Weights and Measures Association (WWMA) agreed with the Committee that nothing in this proposal requires a jurisdiction to permit or prohibit the sale of petroleum products that have been temperature compensated. The WWMA continues its strong support of this proposal and recommends that this item go forward for adoption by the NCWM.

At its October 2004 Meeting, the Northeastern Weights and Measures Association (NEWMA) the members were informed that the L&R Committee has requested that the Board of Directors fund a working group to determine if requirements for temperature compensation should be added to Handbook 130 and, if so, what wholesale and retails areas should be covered. Several participants believed a working group was unnecessary and that working groups should not be created just because a subject is controversial. These members felt there were other items where working groups could better be used. NEWMA suggested removing the words “recognition of” from the title of Item 331-1.

See L&R Item 232-1.

For additional background on this item see the NCWM 2000 through 2004 S&T Final Reports.

331-2 S.1.4.1. Display of Unit Price

Source: National Type Evaluation Technical Committee (NTETC) Measuring Sector

Recommendation: Modify Handbook 44 Section 3.31. Paragraph S.1.4.1. Display of Unit Price as follows:

S.1.4.1. Display of Unit Price. - In a device of the computing type, means shall be provided for displaying ~~on the outside of the device~~, in a manner clear to the operator and an observer, the unit price at which the device is set to compute. The unit price is not required to be displayed continuously.

Discussion/Background: At the 2004 Sector Meeting, a manufacturer of vehicle-tank meters (VTM) asked the Sector to provide input on the intent of Handbook 44 Section 3.31. Paragraph S.1.4.1. Display of Unit Price. The Sector was asked to determine whether or not the unit price must be displayed continuously. The manufacturer referred to the final report of the 1983 NCWM S&T Committee. In the discussion of S&T Agenda Item 304-2 the Committee stated its view that it is appropriate for a digital electronic indicating element associated with a VTM to utilize a shared display, that is the same display area can be used to indicate the volume delivered, the unit price, and the total price. The Sector agreed that the intent of the S&T Committee was clear and further agreed to forward the recommendation to add a clarification note to S.1.4.1. as shown above to the NCWM and the Southern Weights and Measures Association (SWMA) for consideration.

At its October 2004 Meeting, the SWMA agreed with the Measuring Sector's interpretation of the intent of S.1.4.1. The SWMA agreed to forward the recommendation shown above to the Committee as a voting item.

331-3 S.2.4. Zero Set-Back Interlock, Vehicle-Tank Meters

Source: Carryover Item 331-3. (This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2002 agenda.)

Recommendation: Add a new paragraph S.2.4. to Handbook 44, Section 3.31. Vehicle-Tank Meters as follows:

S.2.4. Zero Set-Back Interlock, Vehicle-Tank Meters. – A device shall be so constructed that after a delivery cycle has been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position.
[Nonretroactive as of January 1, 200X]

NTETC Alternate Recommendation: The Measuring Sector recommends adding a new Paragraph S.2.4. Zero Set-Back Interlock, to H44 Sec. 3.31. Vehicle-Tank Meters as follows:

S.2.4. Zero-Set-Back Interlock, Vehicle-Tank Meters. – Except for aircraft fueling, an electronic device shall be so constructed that after an individual or multiple deliveries at one location have been completed , an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for 3 minutes the transaction must be completed before additional product flow is allowed. The 3 minute timeout may be a sealable feature on an indicator designed for commercial and non-commercial applications.
[Nonretroactive as of January 1, 200X]

SWMA Alternate Recommendation: The SWMA recommends adding a new Paragraph S.2.4. Zero Set-Back Interlock, to H44 Sec. 3.31. Vehicle-Tank Meters as follows:

S.2.4. Zero-Set-Back Interlock, Vehicle-Tank Meters. – Except for aircraft fueling, an electronic device shall be so constructed that after an individual or multiple deliveries at one location have been completed , an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for 3

minutes the transaction must be completed before additional product flow is allowed. The 3 minute timeout shall be a sealable feature on an indicator.
[Nonretroactive as of January 1, 200X]

Editors Note: The NTETC recommendation allows the 3 minute timeout feature to be sealable, but does not require it. The SWMA recommendation requires the 3 minute timeout feature to be a sealable.

Background/Discussion: At its October 2003 Meeting, the SWMA considered a proposal to add the specification requiring a zero set-back interlock on vehicle-tank meters as shown above. The submitter explained that a similar specification has been in place for retail motor-fuel dispensers (RFMDs) for many years to prevent a second party from being charged for product delivered to the first party. However, there is no requirement for an interlock on vehicle-tank meters. Currently the only protection is provided by two User Requirements paragraphs, UR.2.3. Ticket in Printing Device, which prohibits the "riding of tickets" and UR.2.1. Return of Indication Element to Zero, which requires the indications to be set to zero before a delivery. Both of these requirements are extremely difficult to enforce especially with the newer technology where printers are frequently mounted inside the cab of the vehicle. The SWMA agreed to forward the proposal to the Committee for consideration as a nonretroactive requirement.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) stated that there is a need to have the ability to make multiple deliveries at a single location or to one buyer without having to remove a delivery ticket. The MMA supported the concept of the proposal, provided it is limited to devices with electronic indicators that have the ability to print more than one delivery on a single delivery ticket. The Committee agreed that 331-3 should remain an information item on the Committee's Agenda to allow the NTETC Measuring Sector and other interested parties time to further develop the proposal.

At the 2004 NCWM Annual Meeting, the MMA stated that a zero set-back interlock is a desirable feature on a system with an electronic indicator, but it is not practical to add the same feature to a system with a mechanical indicator. The MMA agreed that the NTETC Measuring Sector needed to submit a proposal for consideration. At their September 2004 Meetings, the Central and Western Weights and Measures Associations agreed with the MMA.

At the October 2004 Measuring Sector Meeting the members developed an alternative recommendation to add a new paragraph S.2.4. to Handbook 44, Section 3.31. Vehicle-Tank Meters as shown above. The Sector agreed to forward the proposal to the NCWM S&T and the SWMA Committees for consideration.

At its October 2004 Meeting the SWMA reviewed the Measuring Sector's alternative recommendation. The SWMA heard comments that the 3 minute time out feature should be required to be a sealable feature and the word "may" needs to be changed to "shall" in the last sentence of the Sector's proposal. The SWMA agreed to forward its alternate recommendation to the Committee as a voting item on the Committee's 2005 Agenda.

For additional background on this item see the NCWM 2000 through 2004 S&T Final Reports.

331-4 N.4.2. Special Tests (Except Milk-Measuring Systems), N.4.5. Product Depletion Test, and T.4. Product Depletion Test

Source: Carryover Item 331-2. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2003 agenda.)

Recommendation: Amend Section 3.31. as follows:

Amend paragraph N.4.2. Special Tests (Except Milk-Measuring Systems) as follows:

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N.4.1. **or N.4.5.** shall be considered a special test. Special test of a measuring system shall be made ~~as follows.~~

~~(a)~~ at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device whichever is less~~;~~**.**

~~(b) to develop operating characteristics of the measuring system during a split-compartment delivery~~.

Add new paragraphs N.4.5. Product Depletion Test and T.4. Product Depletion Test as follows:

N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter register to stop completely. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single compartment vehicle. When adding product to a single compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test. (Added 200X)

T.4. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed 0.5 % of the equivalent of one minute of flow at the maximum rated flow rate for the system. (Added 200X)

NTETC Alternate Recommendation: The National Type Evaluation Technical Committee (NTETC) Measuring Sector recommends amending Section 3.31. as follows:

Amend paragraph N.4.2. Special Tests (Except Milk-Measuring Systems) as follows:

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N4.1. **or N.4.5.** shall be considered a special. Special tests of a measuring system shall be made ~~as follows:~~

~~(a)~~ at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device whichever is less~~;~~**.**

~~(b) to develop operating characteristics of the measuring system during a split-compartment delivery.~~

Add new paragraphs N.4.5. Product Depletion Test and T.4. Product Depletion Test as follows:

N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter indication to stop completely for at least 10 seconds. If the meter indication fails to stop completely for at least 10 seconds, continue to operate the system for 3 minutes. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single compartment vehicle. When adding product to a single compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test. (Added 200X)

T.4. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed the tolerance shown in Table T.5.

Table T.4. Tolerances For Vehicle Tank Meters On Product Depletion Tests, Except Milk Meters	
Meter size	**Maintenance and acceptance tolerances**
Up to but not including 75 mm (3.0 inches)	**2.25 liters (137 in^3)[1]**
75 mm (3.0 inches) or larger	**3.75 liters (229 in^3)[2]**
[1] Based on a test volume of approximately 900 liters (238 gal) **[2]Based on a test volume of approximately 1500 liters (396 gal)**	

Example:"+25 cu in" error normal test, + or – 137 cu in, for product depletion total error; = + 162 cu in or – 112 cu in.

Note: The result of the product depletion test may fall outside of the applicable test tolerance.

NewYork/WMD Alternate Recommendation: New York Weights and Measures and WMD recommend amending Section 3.31. as follows:

Amend paragraph N.4.2. Special Tests (Except Milk-Measuring Systems) as follows:

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N4.4.1. **or N.4.5.** shall be considered a special. Special tests of a measuring system shall be made ~~as follows:~~

~~(a)~~ at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device whichever is less;

~~(b) to develop operating characteristics of the measuring system during a split compartment delivery.~~

Add new paragraphs N.4.5. Product Depletion Test and T.4. Product Depletion Test as follows:

N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter indication to stop completely for at least 10 seconds. If the meter indication fails to stop completely for at least 10 seconds, continue to operate the system for 3 minutes. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single compartment vehicle. When adding product to a single compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.
(Added 200X)

T.4. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed the tolerance shown in Table T.5.

Table T.4. Tolerances For Vehicle Tank Meters On Product Depletion Tests, Except Milk Meters	
Meter size	**Maintenance and acceptance tolerances**
Up to but not including 50 mm (2.0 inches)	**1.70 liters (104 in^3)[1]**
From 2.0 up to but not including 75 mm (3.0 inches)	**2.25 liters (137 in^3)[1]**
75 mm (3.0 inches) or larger	**3.75 liters (229 in^3)[1]**
[1] Based on a test volume of at least on minutes flow in accordance with N.3.	

Example:"+25 cu in" error normal test, + or – 137 cu in, for product depletion total error; = + 162 cu in or – 112 cu in.

Note: The result of the product depletion test may fall outside of the applicable test tolerance.

Discussion: The proposal intends to recognize that the measurement of vapor when product is depleted during the vehicle-tank meter (VTM) split compartment test (product depletion test) is a system problem and the amount of vapor measured is not related to the size of the test draft. The proposal also requires a split-compartment test (product depletion test) for single compartment vehicles to verify the performance of the air elimination mechanism. Currently paragraph N.4.2.(b) refers only to a split-compartment delivery. The proposal is based on the meters flow rate such that the applicable tolerance remains constant regardless of the size of the test draft.

At its October 2003 NEWMA Meeting, New York expressed concern that the product depletion test would not be considered a "special test" and that tolerances based on the agreement between the normal tests and the product depletion tests might result in accepting values outside the "special test" tolerances. Therefore, NEWMA proposed that the exemption in paragraph N.4.2. ("that the testing set forth in paragraph N.4.5. shall not be considered a "special test") be removed. NEWMA also submitted the following examples of product depletion test results to show the need for a product depletion test tolerance that is not dependent on prover size. The table assumes that error in the meter under normal test conditions is relatively linear between a 100 gal and a 200 gal test and that the actual amount of vapor passed for either.

Examples: Product Depletion Test – Proposed

Meter Marked: 100 gpm Max/20 gpm Min				Proposed
Tolerances:	Acceptance	Maintenance	Special Test	Prod Depletion Agreement
100 gal prover	0.15 gal	0.3 gal	0.45 gal	0.5 gal
200 gal prover	0.30 gal	0.6 gal	0.90 gal	0.5 gal

Sample Test Results (Maintenance Tol.): Assume linear error in normal tests and fixed passage of vapor

	Expected		Expected						Proposed	
Error for Normal Test at 100 gal	Error for Normal Test at 200 gal	Error PD Test 100 gal	Error PD Test 200 gal	PD Agreement	Normal Test P/F		Special Test P/F		Prod Depletion Agreement P/F	
(gal)	(gal)	(gal)	(gal)	gal	100 gal	200 gal	100 gal	200 gal	100 gal	200 gal
0.25	0.50	-0.25	1.00	-0.50	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.50	0.50	-0.50	Pass	Pass	Fail	Pass*	Pass	Pass
-0.25	-0.50	-0.75	0.00	-0.50	Pass	Pass	Fail	Fail	Pass	Pass
0.25	0.50	-0.45	1.20	-0.70	Pass	Pass	Pass	Pass	Fail	Fail
0.00	0.00	-0.70	0.70	-0.70	Pass	Pass	Fail	Pass*	Fail	Fail
-0.25	-0.50	-0.95	0.20	-0.70	Pass	Pass	Fail	Fail	Fail	Fail
0.25	0.50	-0.10	0.85	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.35	0.35	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
-0.25	-0.50	-0.60	-0.15	-0.35	Pass	Pass	Fail	Fail	Pass	Pass

Sample Test Results (Acceptance Tol.): Assume linear error in normal tests and fixed passage of vapor

	Expected		Expected						Proposed	
Error for Normal Test at 100 gal	Error for Normal Test at 200 gal	Error PD Test 100 gal	Error PD Test 200 gal	PD Agreement	Normal Test P/F		Special Test P/F		Prod Depletion Agreement P/F	
(gal)	(gal)	(gal)	(gal)	gal	100 gal	200 gal	100 gal	200 gal	100 gal	200 gal
0.12	0.24	-0.38	0.74	-0.50	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.50	0.50	-0.50	Pass	Pass	Fail	Pass*	Pass	Pass
-0.12	-0.24	-0.62	0.26	-0.50	Pass	Pass	Fail	Pass*	Pass	Pass
0.12	0.24	-0.58	0.94	-0.70	Pass	Pass	Pass	Pass*	Fail	Fail
0.00	0.00	-0.70	0.70	-0.70	Pass	Pass	Fail	Pass*	Fail	Fail
-0.12	-0.24	-0.82	0.46	-0.70	Pass	Pass	Fail	Pass*	Fail	Fail
0.12	0.24	-0.23	0.59	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
0.00	0.00	-0.35	0.35	-0.35	Pass	Pass	Pass	Pass	Pass	Pass
-0.12	-0.24	-0.47	0.11	-0.35	Pass	Pass	Fail	Pass*	Pass	Pass

* Provides different result from 100 gal test.

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) voiced support for the intent of the alternative proposal submitted by the NTETC Measuring Sector, provided T.4. is modified by removing the words "and all test results shall be within applicable tolerances." One official noted that the proposal, if modified as the MMA recommends, provides a substantial change in tolerance; however, that State is in favor of the concept because the tolerance for a given meter is not linked to the size of the prover used for testing. Another Official stated that a product depletion test should be viewed as the test of a "disturbance," similar to a test for radio frequency interference (RFI) on a scale. That official prefers a tolerance expressed as a flat percentage and suggested a tolerance of 0.5 % of the meter's marked maximum flow rate over the step tolerances in the proposed Table T.4. A representative from Measurement Canada indicated that there is an opportunity for the United States and Canada to harmonize the requirement for a product depletion test. Canada is presently using 0.25 % of the meter's marked maximum flow rate; however, Measurement Canada is still conducting a study to determine if the 0.25 % tolerance is appropriate. The Committee agreed that item 331-2 should remain an information item and returned it to the NTETC Measuring Sector for review and further development at its fall 2004 meeting.

At its October 2004 Meeting, the NTETC Measuring Sector reviewed an alternate proposal for Table T.4. developed by Maryland Weights and Measures and NIST/WMD based on the Measurement Canada tolerances for product depletion tests. The Sector agreed with the alternate proposal, provided an example of how the product depletion test would be applied and a note stating that the results of the product depletion test could fall outside of the applicable tolerance for the meter being tested were added following Table T.4. as shown above. The Sector agreed to forward the alternate proposal to the Southern Weights and Measures Association (SWMA) and the Committee for consideration.

At the October 2004 NEWMA Meeting, New York proposed that an NCWM working group be formed to research this item and supplied a discussion paper in support of the proposal. NEWMA agreed to forward the recommendation and the discussion paper to the Committee for consideration.

At its October 2004 Meeting, the SWMA heard no opposition to the proposal from the Measuring Sector. One official asked if a similar requirement should be added to the Section 3.30. Liquid-Measuring Devices for wholesale meters and to Section 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices. The SWMA agreed to forward the proposal to the NCWM S&T Committee with the recommendation that it be a voting item on the Committee's 2005 Agenda. The SWMA also recommended that the Committee consider adding similar requirements to Sections 3.30. and 3.32. as appropriate.

Following the fall meetings of NEWMA, SWMA, and the NTETC Measuring Sector, New York Weights and Measures worked with WMD to add an additional category of meter sizes to the proposed Table T.4. from the NTETC Measuring Sector as shown in the second alternate recommendation above. That work was the result of a New York's concern that a large number of vehicle-tank meters with meters of a size less than 2.0 inches are still in use in that state. The tolerance for meters smaller than 2.0 in was developed based on the current tolerance for a draft of at least one minute's flow for a typical meter of that size. However, the tolerance is not directly related to draft size and remains the same even if the draft size is increased.

For additional background on this item see the NCWM 2000 through 2004 Committee Final Reports.

336 WATER METERS

336-1 Table N.4.2. Flow Rate and Draft Size for Water Meters Special Tests

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Amend Table N.4.2. Flow Rate and Draft Size for Water Meters Special Tests as follows:

Table N.4.2. Flow Rate and Draft Size for Water Meters Special Tests						
Meter size (inches)	**Intermediate Rate**			**Minimum Rate**		
	Rate of flow (gal/min)	**Meter indication/Test Draft**		**Rate of flow (gal/min)**	**Meter indication/Test Draft**	
		gal	**ft^3**		**gal**	**ft^3**
Less than or equal to 5/8	2	10	1	1/4	~~5~~**10**	1
3/4	3	10	1	1/2	~~5~~**10**	1
1	4	10	1	3/4	~~5~~**10**	1
1 1/2	8	50	5	1 1/2	10	1
2	15	50	5	2	10	1
3	20	50	5	4	10	1
4	40	100	10	7	~~50~~**100**	5
6	60	100	10	12	~~50~~**100**	5

(Table Added 2003) **(Amended 200X)**

Discussion/Background: At the Fall 2004 NEWMA Meeting, a manufacturer submitted the proposal shown above. The manufacturer stated that a test draft of 5 gallons is not large enough to provide repeatability for water meters sized 1 inch and smaller. The dial indicator for these devices has 100 graduations of 1/10 gallon, which means one complete revolution equals 10 gallons. The effect of parallax on the reading and gear backlash both contribute to the lack of repeatability of indication when using a 5-gallon test draft. The manufacturer recommends that any test of the device include, at a minimum, at least one complete revolution of the dial indicator. None of the jurisdictions represented at the NEWMA Meeting routinely test water meters; therefore, they could not provide any input on the technical merits of the proposal. However, NEWMA agreed to forward the proposal to the Committee for consideration.

360 OTHER ITEMS

360-1 Proposed Section 5.59. Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices-Tentative Code

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Add a Tentative Code 5.59. Livestock, Meat, and Poultry Evaluation Systems and/or Devices as follows:

Sec. 5.59. Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices – Tentative Code

This tentative code has only a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final Code for Livestock, Meat, and Poultry Evaluation Systems and/or Devices. Officials wanting to conduct an official examination of a device or system are advised to see paragraph G-A.3. Special and Unclassified Equipment.

A. Application

A.1. - This code applies to electronic devices or systems for measuring the composition or quality constituents of live animals, livestock and poultry carcasses, and individual cuts of meat or a combination thereof for the purpose of determining value.

A.2. - See also Sec. 1.10; General Code requirements.

A.3. - This code does not apply to scales used to weigh live animals, livestock and poultry carcasses, and individual cuts of meat unless the scales are part of an integrated system designed to measure composition or quality constituents.

S. Specifications

S.1. Design and Manufacture - All design and manufacturing specifications shall comply with ASTM Standard F 2342 Standard Specification for Design and Construction of Composition or Quality Constituent Measuring Devices or Systems.

N. Notes

N.1. Method of Test. – Performance tests shall be conducted in accordance with ASTM Standard F 2343 Test Method for Livestock, Meat, and Poultry Evaluation Devices.

N.2. Testing Standards. – ASTM Standard F 2343 requires device or system users to maintain accurate reference standards that meet the tolerance expressed in Handbook 44 Fundamental Considerations, paragraph 3.2. (i.e., one third of the smallest tolerance applied) in accordance with.

N.3. Verification. – Device or system users are required to verify and document the accuracy of a device or system on each production day as specified by ASTM Standard F 2341 Standard Practice of User Requirements for Livestock, Meat, and Poultry Evaluation Devices or Systems.

N.3.1. Official Tests. – Officials are encouraged to periodically witness the required "in house" verification of accuracy. Officials may also conduct official tests using the on-site testing standards or other appropriate standards belonging to the jurisdiction with statutory authority over the device or system.

T. Tolerances

T.1. Tolerances on Individual Measurements. - Maintenance and acceptance tolerances in excess and deficiency on an individual measurement shall be as shown in Table T.1.

Table T.1. Tolerances

Individual linear measurement of a single constituent	**" 1 mm (0.039 in)**
Measurement of area	**" 1.6 cm^2 (0.25 in^2)**
For measurements of other constituents	**As specified in ASTM Standard F 2343**

User Requirements

UR.1. Installation Requirements.

UR.1.1. Installation. – All devices and systems shall be installed in accordance with manufacturer's instructions.

UR.2. Maintenance of Equipment.

UR.2.1. Maintenance. – All devices and systems shall be continually maintained in an accurate condition in accordance with manufacturer's instructions and ASTM Standard F 2341.

UR.3. Use requirements.

UR.3.1. Limitation of Use. – All devices and system shall be used to make measurements in a manner specified by the manufacture.

UR.4. Testing Standards. – The user of a commercial device shall make available to the official with statutory authority over the device testing standards that meet the tolerance expressed in Fundamental Considerations, paragraph 3.2. (i.e., one third of the smallest tolerance applied). The accuracy of the testing standards shall be verified annually or on a frequency as required by the official with statutory authority and shall be traceable to a national standard.

Discussion: In 2000 the Grain Inspection, Packers, and Stockyards Administration (GIPSA) branch of the United States Department of Agriculture (USDA) approached NIST and the NCWM to discuss the development of standards for devices used to measure fat content in animal carcasses. When it was determined that neither the NCWM nor NIST had the resources needed to develop such a standard, the American Society for Testing and Materials (ASTM) was contacted as a potential standards-writing body to guide the task of developing the desired standard. The ASTM agreed to develop standards known as ASTM Standard F10 on Livestock, Meat, and Poultry Evaluation Systems for the measurement of fat and other quality constituents in animal carcasses. Some devices or systems will measure only a single constituent, which will be used to determine the value of the carcasses or primal cuts. Other systems may integrate the measurement of several constituents to determine value.

The NCWM agreed that if USDA was able to develop standards for these devices outside of the NCWM, the NCWM would consider adopting these standards, as a tentative code in Handbook 44. The need for a tentative code in Handbook 44 is to provide an enforcement tool for USDA and other jurisdictions wanting to have a mechanism for conducting inspections and approving or rejecting these devices. The ASTM Standards are voluntary standards that only have the effect of law when they are adopted into regulation by a jurisdiction with statutory authority over the devices. Handbook 44 provides a method for that adoption.

At its October 2004 Meeting, the SWMA reviewed a draft tentative code for livestock, meat, and poultry evaluation systems and devices prepared by WMD. The SWMA agreed to forward the proposal to the Committee for addition to Handbook 44 as a tentative code with the recommendation that it be a voting item on the 2005 NCWM S&T Agenda.

360-2 Appendix A Fundamental Considerations 3. Testing Apparatus; 3.1 Adequacy, 3.2 Tolerances for Standards and Footnote 2, and 3.3 Accuracy of Standards

Source: Western Weights and Measures Association (WWMA)

Recommendation: Amend Appendix A Fundamental Considerations 3.Testing Apparatus as follows:

Add amended Footnote 2 to paragraph 3.1 Adequacy as follows:

3. Testing Apparatus

3.1. Adequacy.[2] - Tests can be made properly only if, among other things, adequate testing apparatus is available. Testing apparatus may be considered adequate only when it is properly designed for its intended use, when it is so constructed that it will retain its characteristics for a reasonable period under conditions of normal use, when it is available in denominations appropriate for a proper determination of the value or performance of the commercial equipment under test, and when it is accurately calibrated.

[2]**Recommendations regarding the specifications and tolerances for suitable field standards may be obtained from the Weights and Measures Division of** ~~**The numerical values of the tolerances recommended by the**~~ National Institute of Standards and Technology~~,~~**.** ~~for the s~~Standards will meet the specifications of ~~**length, mass, and capacity used by weights and measures officials, may be obtained upon request from**~~ the ~~**Office of Weights and Measures of the**~~ National Institute of Standards and Technology **Handbook 105-Series standards (or other suitable and designated standards). This section shall not preclude the use of additional field standards and/or equipment, as approved by the Director, for uniform evaluation of device performance**.

Amend paragraphs 3.2 Tolerances for Standards and 3.3 Accuracy of Standards as follows:

3.2. Tolerances for Standards.[2] **-** ~~**The error in a standard used by a weights and measures official should be known and corrected for when the standard is used; or if the standard is to be used without correction, its error should be not greater than one-third of the smallest tolerance to be applied when the standard is used. The reason for this is to keep at a minimum the proportion of the tolerance on the item tested that will be used up by the error of the standard. Expressed differently,**~~ **Except for work of relatively high precision, it is recommended that the accuracy of standards used in testing commercial weighing and measuring equipment be established and maintained so that the use of corrections is not necessary. When the standard is used without correction, its combined error and uncertainty must be less than one-third of the applicable device tolerance.**

Device testing is complicated to some degree when corrections to standards are applied. When using the correction of the standard, the uncertainty associated with the corrected value must be less than one-third of the applicable device tolerance. ~~**t**~~**T**he reason **for this requirement** is to give the ~~**item**~~ **device** being tested as nearly as practicable the full benefit of its own tolerance.

~~**Field testing operations are complicated to some degree when corrections to standards are applied. Except for work of relatively high precision, it is recommended that the accuracy of standards used in testing commercial weighing and measuring equipment be so established and maintained that the use of corrections is not necessary. Also, whenever it can readily be done, it will be desirable to reduce the error on a standard below the one-third point previously mentioned.**~~

3.3. Accuracy of Standards. - Prior to the official use of testing apparatus, its accuracy should invariably be verified. **Field** ~~**S**~~**s**tandards should be ~~**re-verified**~~ **calibrated** as often as circumstances require. By their nature, metal volumetric **field** standards are more susceptible to damage in handling than are standards of some other types. A **field** standard should be ~~**re-**~~calibrated whenever damage is known or suspected to have occurred or significant repairs have been made. In addition, **field** standards, particularly volumetric standards, should be ~~**re-**~~calibrated with sufficient frequency to affirm their continued accuracy, so that the official may always be in an unassailable position with respect to the accuracy of his testing apparatus. Secondary **field** standards, such as special fabric testing tapes, should be verified much more frequently than such basic standards as steel tapes or volumetric provers to demonstrate their constancy of value or performance.

Accurate and dependable results cannot be obtained with faulty or inadequate **field** standards. If either the service person or official is poorly equipped, their results cannot be expected to check consistently. Disagreements can be avoided and the servicing of commercial equipment can be expedited and improved if service persons and officials give equal attention to the adequacy and maintenance of their testing apparatus.

Discussion: In July 2000, the Metrology Subcommittee began discussions on inconsistencies in laboratory calibration practices for ensuring the traceability of field standards. The Subcommittee's work resulted in proposals to modify NIST Handbook 44 (shown above) and corresponding proposals for changes to requirements in NIST Handbook 130 "Uniform Laws and Regulations" to include guidelines for suitable reference standards, test procedures, and practices for determining whether to allow the use of field standards as test apparatus.

Both Handbooks require updating for consistency and to recognize current accepted accreditation/recognition practices for field standards. The Handbooks should be modified to internationally and nationally align metrological terminology and adequately define or clarify terms already in use that relate to field standard verification such as accreditation, calibration, recognition, standards (field, primary, reference, secondary, and working), traceability, uncertainty, and verification. The proposal adds the term "field" to distinguish the type of physical standard in use for testing of devices. The proposal also specifies the appropriate documentary standards and specifies that the field standard's uncertainty must be less than one-third of the applicable device tolerance.

The Subcommittee recommends corresponding modifications to Handbook 130 (See L&R Agenda Item 221-1 and Item 234-1), which include an update in metrological terminology. The Subcommittee developed Handbook 130 language which would allow calibration interval adjustments based on statistical data, where permitted, to improve the accuracy of field standards in use and for more cost-effective use of resources. The Subcommittee further recommends that Handbook 130 reference the entire 105 Series as well as other suitable designated standards. To expedite matters and recognize the latest technology, "Placed in Service Reports" for registered service agencies may be forwarded

electronically to the State Director rather than mailed. Finally, to ensure measurements are allowable, organizations issuing calibration reports must be recognized by NIST WMD or approved by an accreditation body.

The WWMA recommends the proposal as a voting item.

The Central Weights and Measures Association (CWMA) believes that device tolerances already allow for uncertainties, which field officials find difficult to determine. The CWMA notes that use of the term "calibrated" changes the intent of paragraph 3.3. Consequently, the CWMA withdrew the proposal from its Interim Agenda.

The Northeastern Weights and Measures Association recommends the proposal become a developing item, but did not provide a rationale for taking this position.

360-3 International Organization of Legal Metrology (OIML) Report

The complete OIML Report is included as part of the NCWM OIML Board of Director's 2005 Interim Agenda.

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international groups are within the purview of the S&T Committee. Additional information on OIML activities is available in the Board of Directors Agenda, Appendix A and on the OIML web site at http://www.oiml.org/.

For more information on specific device activities see the Weights and Measures Division staff listed in the table below:

NIST Weights and Measures Division Contact List

Staff	Telephone	Email	Device Type	Postal Mail or Fax
Steven Cook (LMD)	301-975-4003	steven.cook@nist.gov	Automatic Weighing Systems Weighing Devices	NIST WMD 100 Bureau Dr MS 2600 Gaithersburg, MD 20899-2600 Fax: 301-926-0647
Richard Harshman (LMD)	301-975-8107	richard.harshman@nist.gov	R 134 "Weighing Road Vehicles In-Motion" R 60 "Load Cells"	
Diane Lee McGowan (LMD)	301-975-4405	diane.lee@nist.gov	R 51 Grain Moisture Meters Near Infrared Grain Analyzers	
Ralph Richter (ILMG)	301-975-4025	ralph.richter@nist.gov	R 117 "Measuring Systems for Liquids Other Than Water" R 105 "Direct Mass Flow Measuring Systems for Quantities of Liquids" and Gas Meters	
Wayne Stiefel (ILMG)	301-975-4011	s.stiefel@nist.gov	Measuring Devices	
Dr. Ambler Thompson (ILMG)	301-975-2333	ambler@nist.gov	Electronic Measuring Devices	
Juana Williams (LMD)	301-975-3989	juana.williams@nist.gov	R 21 Taximeters	

LMD - Legal Metrology Devices Group
ILMG - International Legal Metrology Group

360-4 Add International Terms that are Synonymous to NIST Handbook 44 Terms in Appendix D; Definitions

Source: Carryover Item 360-4. (This item originated from the Northeastern Weights and Measures Association (NEWMA) and first appeared on the Committee's 2002 agenda.)

Discussion: Many Handbook 44 and OIML technical concepts and procedures are in harmony, yet there are significant differences in the terminology used. The harmonization of language is not necessary to harmonize requirements, provided a state of equivalence exists; however, improvements should be promoted where the language is confusing or has the potential for misinterpretation. Currently, the U.S. National Working Group (USNWG) on R 76 "Non-automatic Weighing Instruments" is working on a proposal to amend NIST Handbook 44 Appendix D, Definitions to include

international terminology that is synonymous with Handbook 44 definitions. This item is intended to familiarize the public and private sectors with the proposed approach to modify Appendix D. The USNWG will identify Handbook 44 terms or definitions that are equivalent to international vocabulary in a format that is similar to the example shown below:

> **automatic zero-setting mechanism (OIML R 76: zero-tracking device).** Automatic means provided to maintain zero . . . operation. [2.20]
> **(Amended 200X)**

The full development of this proposal to amend Appendix D will also clarify terminology for international participants in the proposed Mutual Acceptance Arrangement (MAA)(see Board of Directors Agenda, Appendix A for more information), where it is imperative that all affected parties are aware and understand each other's requirements. For example, the Handbook 44 term "automatic zero setting" has an entirely different meaning in R 76. Handbook 44 is also inconsistent in the use of many terms such as "division," "increment," and "interval." The addition of international terminology to existing Handbook 44 language may also help to eliminate any confusion about the use of other frequently used terms such as: device, element, mechanism, scale, weigher, and balance.

NEWMA supports this item and views it as a first step toward educating weights and measures officials. Future efforts should include work to place terms in Handbook 44 text and ultimately having one mutually acceptable set of terminology.

The Committee concurs with NEWMA's assessment that the proposal is a necessary step in work to harmonize U.S. and international terminology and later standards. The Committee decided to keep this proposal as an information item on its agenda to update the weights and measures community on this important work in the harmonization of standards and to allow the work group sufficient time to complete its comparison of Handbook 44 General Code and Scales Code terms with equivalent international terminology.

At its 2004 meeting, the Western Weights and Measures Association requested the Working Group continue to develop terms and the proposal remain an Information Item.

The Central Weights and Measures Association (CWMA) believes international terms serve no purpose for the field official. The CWMA agreed this is an issue for NCWM Publication 14, "NTEP Technical Policy, Checklists, and Test Procedures" therefore, the proposal should be withdrawn from the S&T Agenda.

The Scale Manufacturers of Association supports the efforts of the USNWG and looks forward to reviewing the final proposal as an information item.

360-5 Developing Issues

The NCWM established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing issues have not received sufficient review by all parties affected by the proposal or may be insufficiently developed to warrant review by the NCWM S&T Committee. The developing issues listed below are currently under review by at least one regional association or technical committee.

The developing issues are listed in Appendix B according to the specific NIST Handbook 44 Code Section under which they fall.

The S&T Committee encourages interested parties to examine the proposals included in Appendix B and send their comments to the contact listed in each item.

The Committee asks that the regional weights and measures associations and National Type Evaluation Technical Committee Sectors continue their work to fully develop each proposal. Should an association or Sector decide to discontinue work on a developmental item, the Committee asks that it be notified.

Appendix A

Item 360-5: Developing Issues

Part 1, General Code

Source: Western Weights and Measures Association (WWMA)

Recommendation: Modify paragraph G-S.5.6.1. as follows:

G-S.5.6.1. ~~Recorded Representation of Metric Units on Equipment with Limited Character Sets~~ Acceptable Abbreviations for Recorded and Indicated Representation of Units on Equipment. - The appropriate defining symbols are shown in Table 1.

Add the following new abbreviations to Table 1 Representation of Units to the General Code:

Name of Unit	Common Use Symbol	Representation			Name of Unit	Common Use Symbol	Representation		
		Form I	Form II				Form I	Form II	
		(double case)	(single lower case)	(single case upper)			(double case)	(single lower case)	(single case upper)
Inches	in	In	in	IN	deciliter	dL	dL		
Foot	ft	ft	ft	FT	Kiloliter	kL	kL		
Yard	yd	yd	yd	YD	cubic meter	M^3	m^3	m^3	M^3
milligram	mg	mg	mg		cubic inches	in^3	in^3	in^3	IN^3
megagram	Mg	Mg			cubic foot	ft^3	ft^3	ft^3	FT^3
Grain	gr	gr	gr		cubic yard	yd^3	yd^3	yd^3	YD^3
Dram	dr	dr	dr		Gills	gi	gi	Gi	GI
Ounce	oz	oz	oz	OZ	Pint	pt	pt	pt	PT
Pound	lb	lb	lb	LB	Quart	qt	qt	qt	QT
hundredweight	cwt	cwt	cwt	CWT	Gallon	gal	gal	gal	GAL
pennyweight	dwt	dwt	dwt	DWT	Ampere	A, I	A, I		A, I
ounce troy	oz t	oz t	oz t	OZ T	resistance	ohms	ohms	ohms	OHMS
milliliters	mL	mL							
centiliter	cL	cL							

Discussion: The WWMA notes that the current General Code Table 1 Representation of Units does not include many units that are in common use today.

At its 2004 meeting, the WWMA indicated that unless it receives a report on the development of the table, the proposal will be withdrawn from its 2005 agenda.

To provide input on this proposal contact Gary Castro, California Division of Measurement Standards by telephone at 916-229-3018, by fax at 916-229-3015, or by email at gcastro@cdfa.ca.gov.

Part 2, Scales

Source: Northeastern Weights and Measures Association (NEWMA)

Recommendation: Modify Table 4. Minimum Test Weights and Test Loads as follows:

Table 4.
Minimum Test Weights and Test Loads[1]

Device capacity	Minimums (in terms of device capacity)		(where practicable)
	Test weights (greater of)	Test loads[2]	
0 to 150 kg (0 to 300 lb)	100 %		
151 to 1 500 kg (301 to 3 000 lb)	25 % or 150 kg (300 lb)	75 %	Test weights to dial face capacity, 1 000 d, or test load to used capacity, if greater than minimums specified
1 501 to 20 000 kg (3 001 to 40 000 lb)	12.5 % or 500 kg (1 000 lb)	50 %	
20 001 kg~~+~~ **to 250 000 kg** (40 001 lb~~+~~ **to 500 000 lb**)	**12.5 % or 5 000 kg (10 000 lb)**	25 %[3]	During initial verification, a scale should be tested to capacity.

[1] If the amount of test weight in Table 4 combined with the load on the scale would result in an unsafe condition, then the appropriate load will be determined by the official with statutory authority.

[2]The term "test load" means the sum of the combination of field standard test weights and any other applied load used in the conduct of a test using substitution test methods. Not more than three substitutions shall be used during substitution testing, after which the tolerances for strain load tests shall be applied to each set of test loads.

[3] The scale shall be tested from zero to at least 12.5 % of scale capacity using known test weights, and then to at least 25 % of scale capacity using either a substitution or strain load test that utilizes known test weights of at least 12.5 % of scale capacity. Whenever practical, a strain load test should be conducted to the used capacity of the scale. When a strain load test is conducted, the tolerances apply only to the test weights or substitution test loads.
(Amended 1988, 1989, 1994, and 2003)

Discussion: NEWMA submitted the proposal because jurisdictions encounter scales with 1 000 000 lb nominal capacity and must determine the minimum test load. NEWMA finds that NIST Handbook 44 is flexible, but does not provide any definitive guidelines on test loads for large capacity scales. NEWMA modified its original proposal by reducing the scale maximum capacity from 1 000 000 lb to 500 000 lb and removing a proposed new footnote that permitted officials to establish the minimum test load. NEWMA supports the proposal as a voting item.

The Committee agreed that Table 4 is the appropriate place in Handbook 44 to provide some guidance on the appropriate minimum test load for subsequent tests on scales that exceed capacities of 400 000 lb. The Committee believes that the issue warrants a high priority, but requires further review and input from both the public and private sectors.

The Western Weights and Measures Association (WWMA) agreed that the proposal does not address the minimum load for scales with nominal capacities greater than 500 000 lb. For example, a 500 000 lb capacity scale could be tested with a test load less than that required to test a 400 000 lb scale. The WWMA recommends 62 500 lb minimum test weights and a 125 000 lb minimum test load for scales with capacities greater than 500 000 lb.

The Central Weights and Measures Association (CWMA) questions why a limit was set on the device's capacity since current Table 4 recognizes device capacities greater than 40 000 lb. The CWMA recommends withdrawing the proposal, based on the way the language is written.

The Scale Manufacturers Association (SMA) opposes this proposal and recommends that it be withdrawn as a developing issue. The SMA, like the CWMA, questions why a limit was set on the device's capacity since the language in current Table 4 recognizes device capacities greater than 40,000 lb.

To provide input on this proposal contact Michael Sikula, New York Bureau of Weights and Measures, by telephone at 518-457-3452, by email at mike.sikula@agmkt.state.ny.us, or by fax at 518-457-2552.